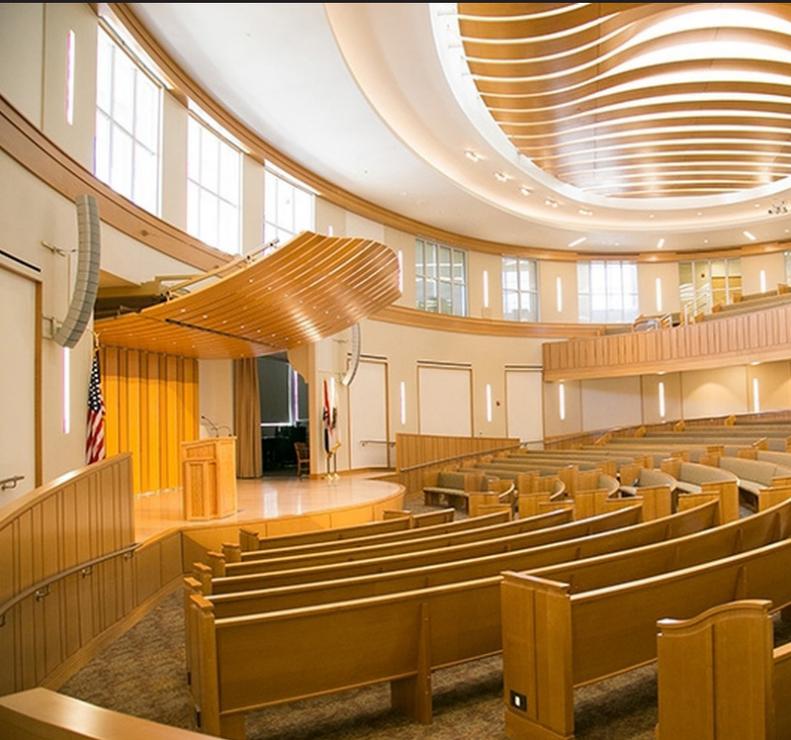


CASE STUDIES

O-LINE™



Unite Your Audience
The Martin Audio Experience





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 forty 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.

O-Line – Micro-Line Array



O-LINE™ is a versatile, micro-line array now with scalable resolution designed to tame a wide variety of architectural and challenging acoustic environments.

In its standard set up with uniform amplification, it is the articulation of individual array modules that delivers the consistent sound coverage over a defined area. The array configuration for a specific area is determined by industry leading optimisation software which makes intelligent judgements about how well the array performs against objective target functions. This enables focused sound energy to be delivered precisely where needed and kept away from reflective surfaces and ceilings — reducing the

detrimental influence of the room and increasing clarity and intelligibility in challenging acoustic environments.

This can now be taken further with DSP optimisation delivered via DISPLAY and use of an iKON iK81 eight-channel amplifier to independently control and power each individual enclosure, or groups of enclosures.

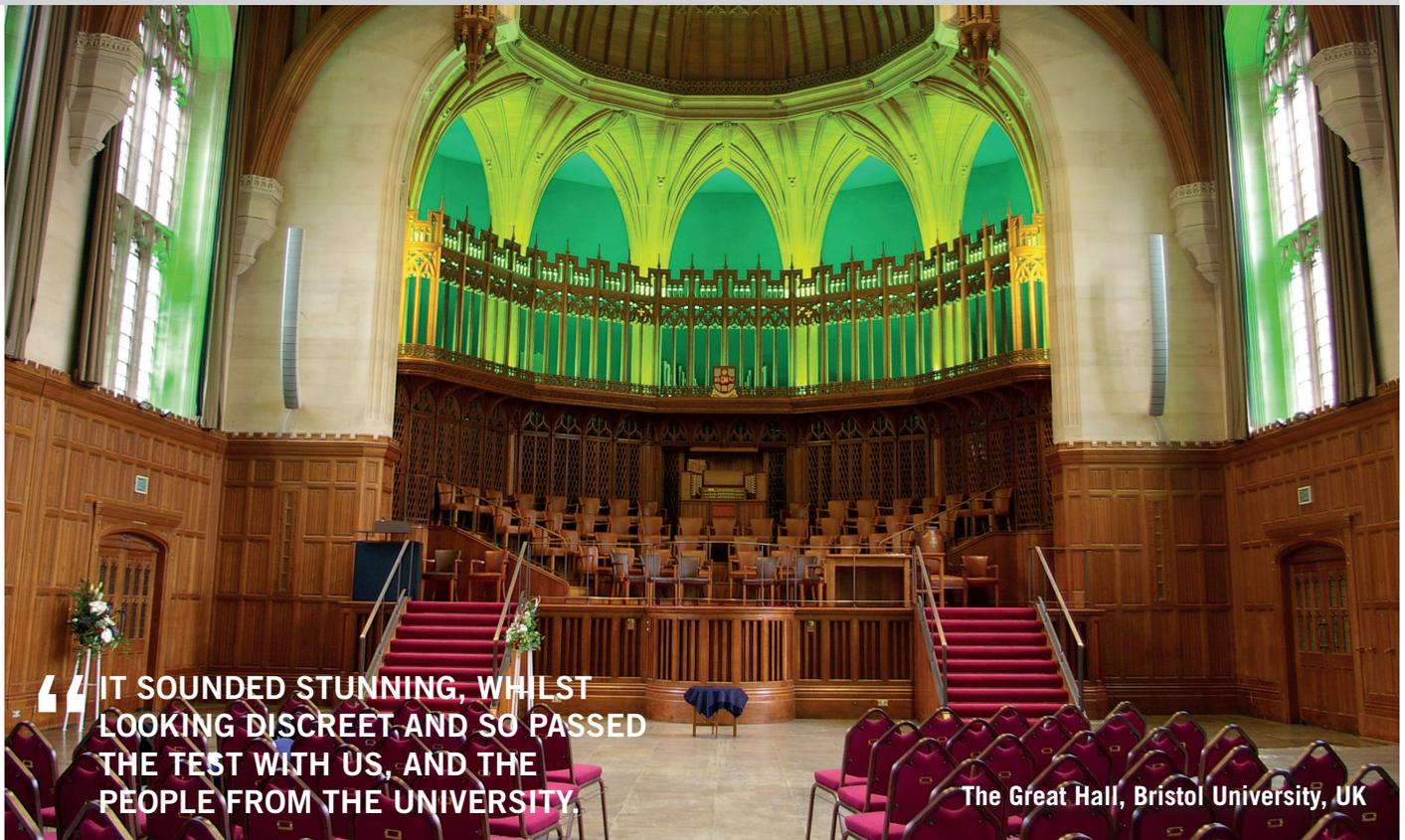
This unlocks the full potential of O-Line — further refining coverage consistency and increasing the ability to 'dial-out' the influence of the room by accessing DISPLAY's 'hard avoid' capability and electronically adjustable coverage.



This can also enable additional benefits to any installation. More often than not, many installations can suffer from height restrictions and the combination of both mechanical and DSP optimisation can compensate this challenge. Similarly, some installations require a flatter array for aesthetic reasons and so additional DSP optimisation can compensate for the lack of mechanical optimisation available. There is also the scenario that following an installation something changes in the venue and rather than have to de-rig and re-rig, electronic optimisation alone can provide a level of coverage change. Similarly, it maybe that the venue is multi-purpose with changing sizes of audience and so by using DISPLAY with VU-NET control it's possible to have different pre-sets to cater for these coverage changes.

AUDITORIUMS

O-Line's Gothic Paradise at The Great Hall



IT SOUNDED STUNNING, WHILST LOOKING DISCREET AND SO PASSED THE TEST WITH US, AND THE PEOPLE FROM THE UNIVERSITY.

The Great Hall, Bristol University, UK

One of the UK's most important gothic buildings commissioned a new audio infrastructure to extend its functionality within the precincts of Bristol University.

With its two balconies, The Great Hall of the Wills Memorial Building can seat up to 900 people for plenary lectures and 270 for banqueting. Hosting a vast range of functions and events, including Christmas carols, organ recitals, graduation day ceremonies, VIP and academic lectures — as well as third party rental providing an additional revenue stream, it therefore required a versatile sound system.

The entire integration at Wills Memorial Building was undertaken by locally-based contractors, Sounds Commercial, and was constructed around two 24-box hangs of Martin Audio's O-Line micro line array.

O-Line is a versatile, micro line array designed for installation in a wide variety of architectural environments. Its modular approach and scalability extend its use from foreground applications to sound reinforcement in large acoustic spaces. Intelligent software enables an array to be configured to deliver sound precisely over any vertical angle to fit the venue profile, without spilling onto surfaces where sound is not required. Additionally, elimination of high-frequency side lobes gives O-Line the advantage over currently available DSP-steered columns, making it suitable for high quality music reproduction as well as speech in large reverberant spaces.

Perfect criteria then for a high vaulted space such The Great Hall, surrounded as it is by the academic teaching spaces of Bristol University.

“What we were looking for was clarity, evenness of coverage and directivity because it's all teaching space around here and so containment was important; there were also the aesthetic concerns. We just fed the system with a CD and radio mics — it sounded stunning, whilst looking discreet and so passed the test with us, and the people from the university”, said Sounds Commercial's project manager, Blake Gifford,

A biamped solution was recommended, with the entire system run from Martin Audio's four-channel MA6.8Q. By splitting the system into biamp mode Sounds Commercial were able to provide increased punch at the back — with 3dB boost for the top eight boxes, firing at the balcony. Given the high directivity of the line array no delay system was necessary.

In addition to O-Line, two Martin AQ28's face back from the stage pillars to provide performance monitoring, while a further pair of AQ6's provide booth monitoring up in the control room.

“We have been fortunate in that there hasn't been any kind of acoustic treatment necessary,” summarise the Sounds Commercial project team. “In fact very little processing has been necessary.”

University Chooses Martin Audio for College Of Arts & Media

Lakeland, FL—The recently completed College of Arts & Media facility at Southeastern University benefits from a full complement of Martin Audio including an O-Line micro line array system in the auditorium along with CDD and CDD-LIVE speakers in the music and practice rooms.

MABE in Lakeland was the integrator for the project and Lead Account Manager Steve Griner explains, 'The College of Arts & Media is a new multi-use facility, with classrooms and an auditorium on the ground floor. The Martin Audio O-Line is installed in the auditorium that serves as a large multi-purpose lecture hall used for lectures, guest speakers and music ensembles.

'The space has a raked floor with the seating sloping down to a podium on a sunken stage below a large 16 x 9 projection screen in the center and the speakers alongside. We mounted the O-Line on the wall in a left-right configuration with eight enclosures on each side and two CSX subs flown

from the ceiling—all powered by Martin Audio amps. The original idea was for a Surround system which led us to the O-Line because we felt the University could build off those speakers and add side fills and a center channel later if we needed.'

Asked about the O-Line's performance, Steve says, 'We really didn't know O-Line that well before the install but we loved the compact size, sleek, curved shape, and how the speakers fits seamlessly into the space. And, most important, the University is very happy with the system and pleasantly surprised by the impressive volume, SPL, clarity and lower frequency response from such a small box.'

Ian Fritzsche, Director of the Media Services Department for the University, confirms Griner's comments with added perspective: 'We think of the facility as a 'live-learn' building with four stories and a mezzanine including the College of Arts & Media and standard classrooms, a food



College of Arts & Media, Southeastern University

court and two levels of dorm rooms. The building is split with a walkway in the middle.

“**THE UNIVERSITY IS VERY HAPPY WITH THE SYSTEM AND PLEASANTLY SURPRISED BY THE IMPRESSIVE VOLUME, SPL, CLARITY AND LOWER FREQUENCY RESPONSE FROM SUCH A SMALL BOX.**

‘The 200-seat lecture hall is the flagship space for the building,’ Ian continues, ‘but challenging in terms of finding the right speaker system because it’s bigger than a classroom and smaller than a huge auditorium so a typical line array system would be overkill in terms of being visually obtrusive and overwhelming in terms of the sound.’

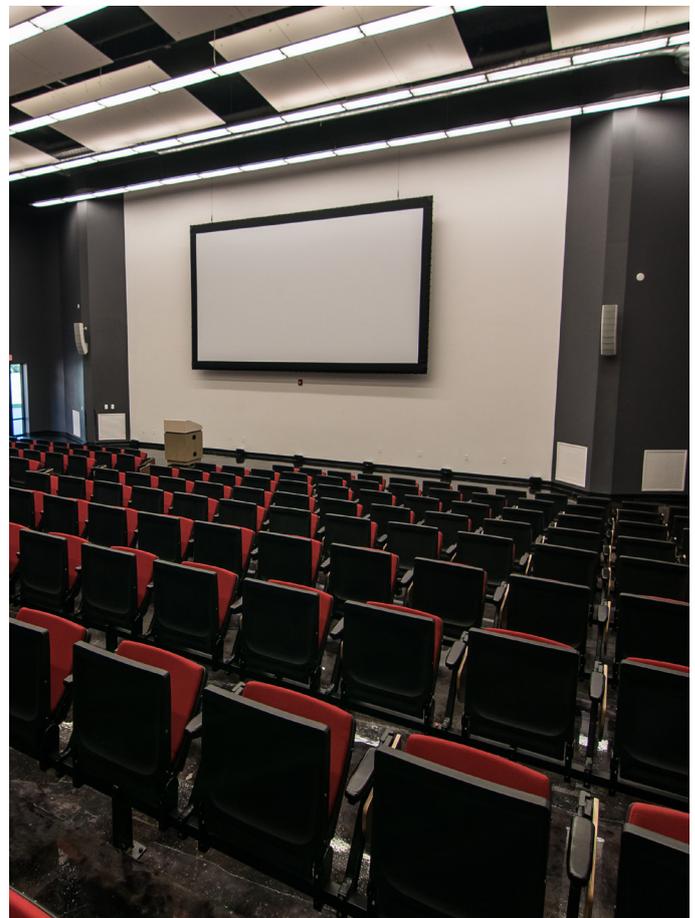
‘We needed a speaker system that could easily cover anything from one professor with accompanying video or PowerPoint presentation to a theater for films and a concert space for electric bands and small acoustic ensembles. So, we had to put in a sound system that was capable of handling anything we could throw at the room.’

‘In terms of the installation, we flattened out the unique triangular pointed acoustic wall framing on either side of the projection screen so the O-Line speakers could be easily mounted on the wall. We also installed an Allen & Heath GLD-80 console with a Crestron control system for the audio so a professor can walk in and play a video without a technician. But we can also use it with an engineer and fire up additional inputs, so we have exceptional flexibility with the system. It’s very scalable for all kinds of events.’

“**THE O-LINE HAS BEEN GREAT. THE SYSTEM EASILY FILLS THE ROOM WITHOUT BEING OVERBEARING OR OBTRUSIVE. IT HAS A VERY SMALL FOOTPRINT, SO YOU HARDLY KNOW THE SPEAKERS ARE THERE UNTIL THEY’RE ON.**

Martin Audio CDD and CDD-LIVE speakers are also a centerpiece of the College’s music spaces: ‘We have two CDD8s mounted in the rooms that are used for music and piano instruction and percussion practice where they need better playback quality,’ Ian points out. ‘Also, there’s a large orchestra rehearsal room with two CDD-LIVE 15s, which sound fantastic and really fill out the room.’

Asked about the O-Line’s performance, he concludes, ‘As it turns out, the O-Line has been great. The system easily fills the room without being overbearing or obtrusive. It has a very small footprint, so you hardly know the speakers are there until they’re on and their appearance blends right into the feel of the room. They have more than held their own for every event, so I’m very happy with them.’



Brauer Hall Upgraded with Martin Audio

TSI Global recently upgraded Brauer Hall, a handsome and elegant 800-seat auditorium at the Mary Institute and St. Louis Country Day School (MICDS), with a Martin Audio O-Line system.

Asked about the project, Paul Murdick, General Manager, TSI Global Companies LLC, explains: 'The school came to us because they wanted a more multifaceted sound system for background music and pep rallies instead of voice only.'

'We recommended and designed a Martin Audio solution with O-Line based on the system's compact size and unobtrusive aesthetic appearance that blends seamlessly with the hall's modern, curvilinear architecture while delivering the coverage that was required.'

'The client thought they would need under balcony fills,' Paul continues, but once we mapped it out, they were pleased to find out the additional expense of dedicated speakers wouldn't be required--which added real value to the system. Now they're getting excellent coverage in the main seating, balconies and under balconies and are very pleased.'

Describing the acoustic challenges implicit in Brauer Hall, TSI Global Audio System Designer Lee Buckalew adds, 'The auditorium is all hard surfaces and the room's shape is essentially oval or parabolic with curved front and back walls. We know that O-Line would provide consistent balcony and under balcony coverage along with a level of coherence in the reflected sounds that we would inevitably have to deal with in such a live space.'

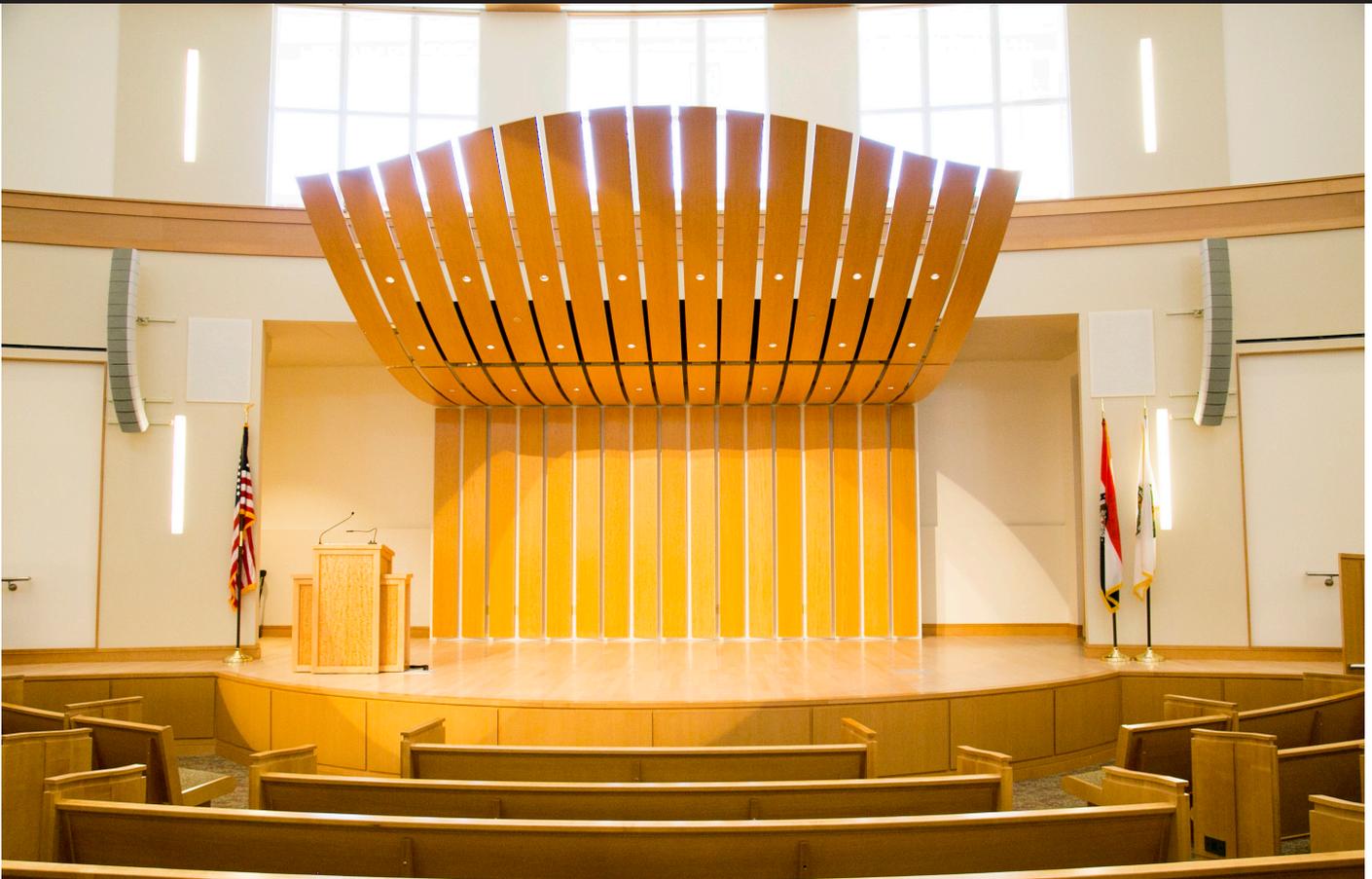
'The under balcony section floor to ceiling measures only around 8 ft. tall at the beginning, while the balcony wraps around the back side of the room facing the stage. Also, the front rows are located roughly within six feet of the speakers, which makes it even more challenging.'

To overcome these issues, TSI set up 16 O-Line enclosures at each side of the stage. They also installed Martin Audio PSX powered subs in niches alongside the acoustic reflector at the proscenium wall.

'The previous system was powered and housed in those niches,' Lee points out, 'so we had existing line level wire and power circuits available. That eliminated the need



Auditorium, Brauer Hall



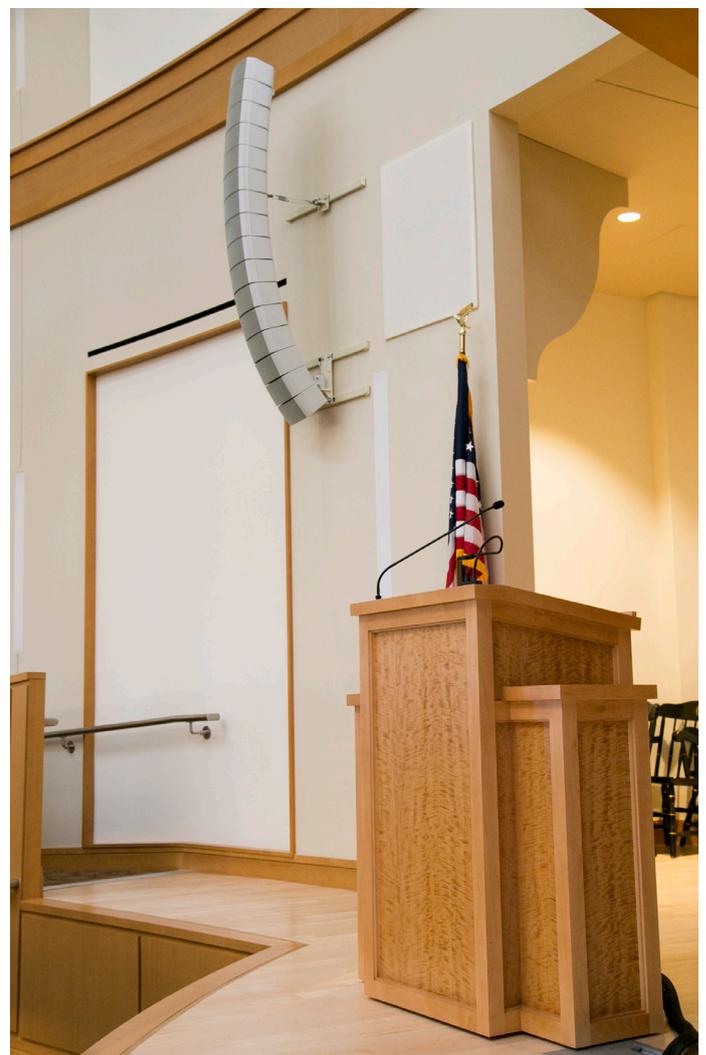
“ O-LINE IS A NIGHT AND DAY DIFFERENCE FROM WHAT THEY HAD BEFORE IN TERMS OF THE COVERAGE AND AUDIO QUALITY.

to install new speaker cable back to an amplifier room, which would have required a lot more expense and labor. In addition to bass reinforcement, the PSX has a second channel of amplification to power the O-Line arrays. It also provides full compatibility for VU-NET software and access to a full range of DSP functions as well.

‘From a coverage standpoint, the issues had been overall level balance throughout the room and intelligibility in what is an acoustically ‘live’ room. Given that we couldn’t do acoustic treatment to the space, we wanted to provide even coverage so that reflections were also phase and frequency coherent, and O-Line was a good choice for that in a very compact enclosure.’

Commenting on the client’s reaction to the upgrade, Lee sums up, ‘O-Line is a night and day difference from what they had before in terms of the coverage and audio quality. Tom Wyman, Director of Technology, and other MICDS staff are just ecstatic. Before, teachers who would come into the back of the hall couldn’t understand what was being said on stage. All of that has changed completely with Martin Audio O-Line. The system represents a truly phenomenal change.’

Photo credit: Catina Bryant



O-Line Meets Pure AV’s University Challenge



“ WE LOVE THE SYSTEM FOR ITS VERSATILITY.”

University of Cumbria

System integrators Pure Audio Visual have been achieving increasing success with Martin Audio’s discreet O-Line micro array systems in university lecture and room multi-purpose facilities as its reputation spreads.

Pure AV Systems Specialist Colin Hasted has helped this award-winning system open up a vibrant new channel for a product that has traditionally been more prevalent in the HoW sector.

“Since receiving budget approvals, universities in the north west, in particular, have gone for this in a big way — adopting O-Line through example,” he says. “O-Line has proved ideal for awkward, multi-purpose spaces with difficult acoustics, where a discreet solution is required. As a result, we have O-Line in well over half of the north west universities and all the Liverpool universities — with more to come!

“This solution stresses the importance of the audio component in AV integrations which have historically been dominated by video. At times when multi-media / high impact learning is so prevalent, clearly distributed audio, as demonstrated by O-Line, helps to boost concentration and remove any fatigue.”

Situated at the University of Cumbria, the Energus events/conference venue in Workington is the place where Pure

AV’s O-Line journey began around five years ago. Pure AV were approached to provide a complete AV solution for their state of the art training facility in Lillyhall. “It was a lecture theatre in a circular/cylindrical room with a horrendous acoustic,” Colin Hasted remembers.

“Prior to Pure AV’s involvement, the client’s expectations for their centrepiece auditorium was mono pendant speakers — since the auditorium was round, and the roof rose steeply from the rear of the room. Space was also an issue as any standard speakers would be extremely close to the presenter area. “

Using the Martin Audio O-Line software, Pure AV demonstrated that good quality FOH reinforcement could be achieved without excessive spill — both into the ceiling void and presenter area by precisely controlling the directivity.

They specified an eight-element O-Line array each side of the projection screen in traditional theatre format, along with Martin Audio AQ5’s and AQ112 single 12in sub. “This gave them full 5.1 surround sound, something the client didn’t think achievable.”

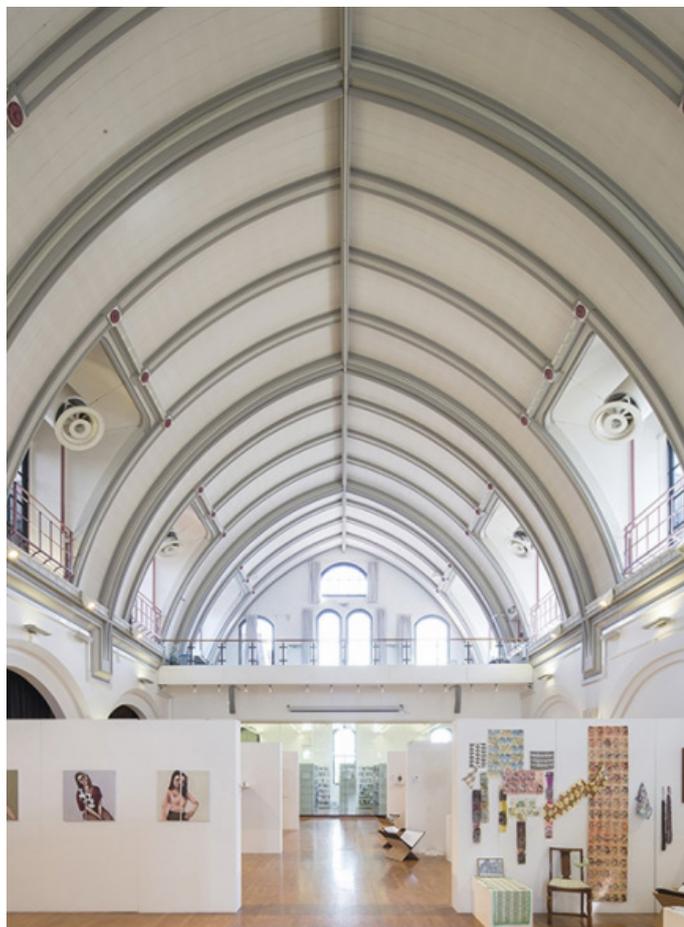
Word spread fast and other educational establishments were quick to follow. Immediately impressed with the Energus install had been Redcar & Cleveland College, where their

performance space and conference room was soon boasting a similar pair of eight-cell O-Line hangs, a perfect dynamic solution for a multi-functioning space.

At the 264-capacity Main Arts Lecture Theatre (MALT) at Bangor University Pure AV designed an L/C/R O-Line set-up with a central hang of four elements flanked by two six-box hangs having demonstrated that the system could provide even coverage and excellent intelligibility, obviating the need for a separate vocal PA system. With some low-end reinforcement the system was sufficiently dynamic to make light work of even the most demanding surround sound content.

But Universities have differing uses for their multipurpose spaces. Lancaster University (LICA), for instance, is a performance arts facility that posed new challenges. The building is entirely built from wood and thus had reverberation issues. Specifying the O-Line system meant that the audio could be accurately aimed to limit any hard reflections from the back wall. As this is mainly a drama space, speech intelligibility, especially from head and lapel mics, was paramount and care was needed to place the sound away from the stage and firmly in the audience.

Also situated at Lancaster University, the Bowland Lecture Theatre/Cinema is another multi-purpose space requiring excellent speech intelligibility and even content playback for its role as a lecture theatre; but once lectures are finished for the day the room converts to a student cinema. Again, two eight-element hangs of O-Line, with a little low end reinforcement, met all the requirements perfectly.



The success continued in Liverpool where John Moores University was the recipient of twin O-Line eight-cell hangs, with further twin O-Line six-cells in two smaller spaces. Using different array sizes in the three theatres not only suited the theatre dimensions but also ensured consistent voicing across all theatres, notes Colin Hasted.

Based nearby, Liverpool's Hope University approached Pure to look at their Everton Hall. The existing set-up was a distributed system mounted high above the space. With its vaulted ceiling, the hall's distributed system was simply 'exciting' the room too much. Pure AV opted for the O-Line as they were confident that the excellent directivity of the unit could bring the room under control without the expense of sympathetic acoustic treatment. With the twin eight-cell O-Lines installed, the facility can now host everything from lectures to live performance.

At University of Manchester, Pure AV replaced the existing line array which, despite having the volume required to fill the room, didn't have the necessary directivity to tame the poor reverberant acoustics in the University Place building, with its high roof void. They designed a system for a 600-seat main room, expandable to 1000 when the overflow space is incorporated into the main space. This required greater muscularity and the L/R hangs of 12-cell O-Lines are complemented by twin six-cell O-Lines at the mid point and a further repeated delay of four elements per side at the rear to overcome the acoustics for conferencing and lectures.

At Keele University's 400-seat Westminster Theatre Pure AV specified further stacks of 12-cell O-Lines along with a Martin Screen Sub (from its cinema portfolio) which recesses into the space vacated by the pre-existing sub. Impressed with the system, Keele has now purchased a further dual eight-cell system for one of its major lecture theatres.

"As with all our installations we use SMAART system alignment, with the speaker management handled in the DSP," states Hasted. "This ensures that every system is fully optimised for each space."

Following on from the success, Pure AV moved south to the 260-seat lecture theatre at Harper Adams University in Telford with two hangs of eight-element O-Lines, cross firing to squeeze the sound under the existing balcony.

Colin Hasted says that O-Line has now become the central component in a rolling upgrade programme as Pure AV continue to establish a high-grade solution in the educational sector. "We love the system for its versatility — it's extremely good for speech and with the sub added in it gives a punchy music response. Once the system is balanced you can throw anything at it and it never sounds harsh — the clarity is hugely impressive," he says.

"The ability to either fly or wall-mount these provides extra flexibility, and of course there are no loading problems as the volume to weight ratio is stunning."

Byu Idaho Finds Discreet Solution With O-Line



“THE O-LINE WORKS REALLY WELL FOR SPEECH INTELLIGIBILITY, WHICH IS THE MAIN CONCERN AS WELL AS REPRODUCTION OF ACOUSTIC MUSIC.”

Brigham Young University

Brigham Young University – Idaho wanted a new sound reinforcement system for its Barrus Auditorium Concert Hall and Taylor Chapel that would provide higher quality audio without being visually intrusive.

Jon Perdue, A/V Production & Broadcast Manager for the University details the challenge: “Barrus auditorium also functioned as a chapel and the original sound system lacked clarity and wasn’t up to today’s standards in terms of quality for vocals and instrument reproduction. The university had authorized us to upgrade but the music department was very concerned about hanging a conventional system in the room because they thought it would look terrible and we didn’t want to ground-stack speakers alongside the stage either.”

“I was speaking with my friend Robert Weddings at RMB Audio,” continues Perdue, “and he had been telling me about this amazing sounding and ultra-compact O-Line array from Martin Audio. He convinced me to get a demo of the system that we flew in the Taylor chapel, the other space we were upgrading, and we were all totally amazed about how good it sounded in terms of the coverage and clarity.”

Whilst its sound impressed, O-Line’s unobtrusive appearance proved to be decisive: “The array’s small size was a crucial factor for the administration, Jon points out, “plus the aesthetics of the system and the fact that it looked so good. O-Line passed with flying colours in both

rooms and they thought the clusters looked very attractive in the venue. To be honest, it was a very easy sell; I didn’t think it would be. And when they heard it, the results were jaw dropping!”

In order to cover the Barrus Auditorium, a spacious 682-seater which hosts over 110 events a year, Perdue and his crew hung 16 O-Line modules per side, each with an AQ210 sub flown alongside to support the low frequency requirements for the program material without losing any clarity.

When the stage is extended for certain events, the four bottom modules can be turned off to compensate for the first five rows. This setup has proved to be far more than adequate for the choral and orchestral groups, pianists, light jazz ensembles and acoustic music performers that appear there.

Commenting on the Barrus installation, Perdue adds, “Because it’s such a ‘live’ room, they wanted a natural-sounding system. Something that didn’t sound like it was coming from a box hanging from the ceiling and blended well and smoothly in the room. That was a huge challenge, but the fact that the O-Line boxes sound so musical and acoustically transparent was a huge plus for us.”

The Taylor Chapel is a multi-purpose venue that holds approximately 450 people with an overflow capability in three smaller rooms that can accommodate an additional



850. Two discrete eight-module O-Line hangs on either side of the rostrum cover the chapel along with two AQ210 subs under the stage.

While Barrus auditorium is ostensibly designed for sound, the Taylor Chapel is another story. “The room is very challenging,” Perdue explains. “The roof line is stepped, very high over the stage, and then drops down three feet every four feet through the rest of the room. The sides are splayed outwards and made up of floor to ceiling windows, also a problem, but the O-Line works really well for speech intelligibility, which is the main concern as well as reproduction of acoustic music.”

Summing up the impact of the audio upgrade, Jon concludes “The university is very happy with the sound and they’ve gotten no complaints about the esthetics in both rooms, a crucial factor, because they’re such a small box and so attractive. They kind of hide themselves within the room so it’s been 100% satisfaction in terms of the way they look. I’ve installed systems in churches all my life and the biggest hurdle is always the way it looks.”



HOUSES OF WORSHIP

Martin Audio O-Line Receives The Royal Treatment



Westminster Abbey, London

St Andrew's Cathedral, Sydney



Wizard Projects, supported by the engineering team from Technical Audio Group (TAG) have installed a large 140-element Martin Audio O-Line system into St Andrew's Cathedral, Sydney. The system needed to be commissioned in time for the visit by the Duke and Duchess of Cambridge, as part of their Australia and New Zealand tour.

St. Andrew's is the oldest cathedral in Australia — and one of the city's finest cathedral examples of Gothic Revival architecture — however such beautiful architecture comes at an acoustic cost with challenging reverberation times making clarity and evenness of coverage across the congregation a constant issue.

Having struggled with a sound system that failed to deliver clear speech intelligibility and live music reproduction, with the Royal appointment imminent, the church's decision to install a new system reached emergency status.

Ross Cobb, Director of Music at St Andrew's, and Canon Chris Allan were given the job of raising tenders for design, installation and commissioning of a state of the art system with absolutely no compromise in sound quality — to be fulfilled in just two weeks.

The task was awarded to Wizard Projects, led by senior engineer Michael Sheldrick with an electro acoustic design team of Glenn Leembruggen and David Gilfillan; the final piece in the jigsaw was the proven Martin Audio O-Line micro line array, supplied by the manufacturer's Australian distributor, Technical Audio Group (TAG).

Having heard O-Line in similar church installations Ross was impressed not only with the amazing consistent coverage and fidelity but also the aesthetic aspect.

The team identified a number of key design hurdles: the church's long RT time, sub bass placement and beam steering. The unusual logistics of church services involves a 360 degree presentation from the pulpit, a centre transept area where choirs and clergy require sound reinforcement and a church where the congregation could sit anywhere at any service and expect perfect sound. On top of that, priests would move through the nave on headset radio mics with open mics for question and answer sessions.

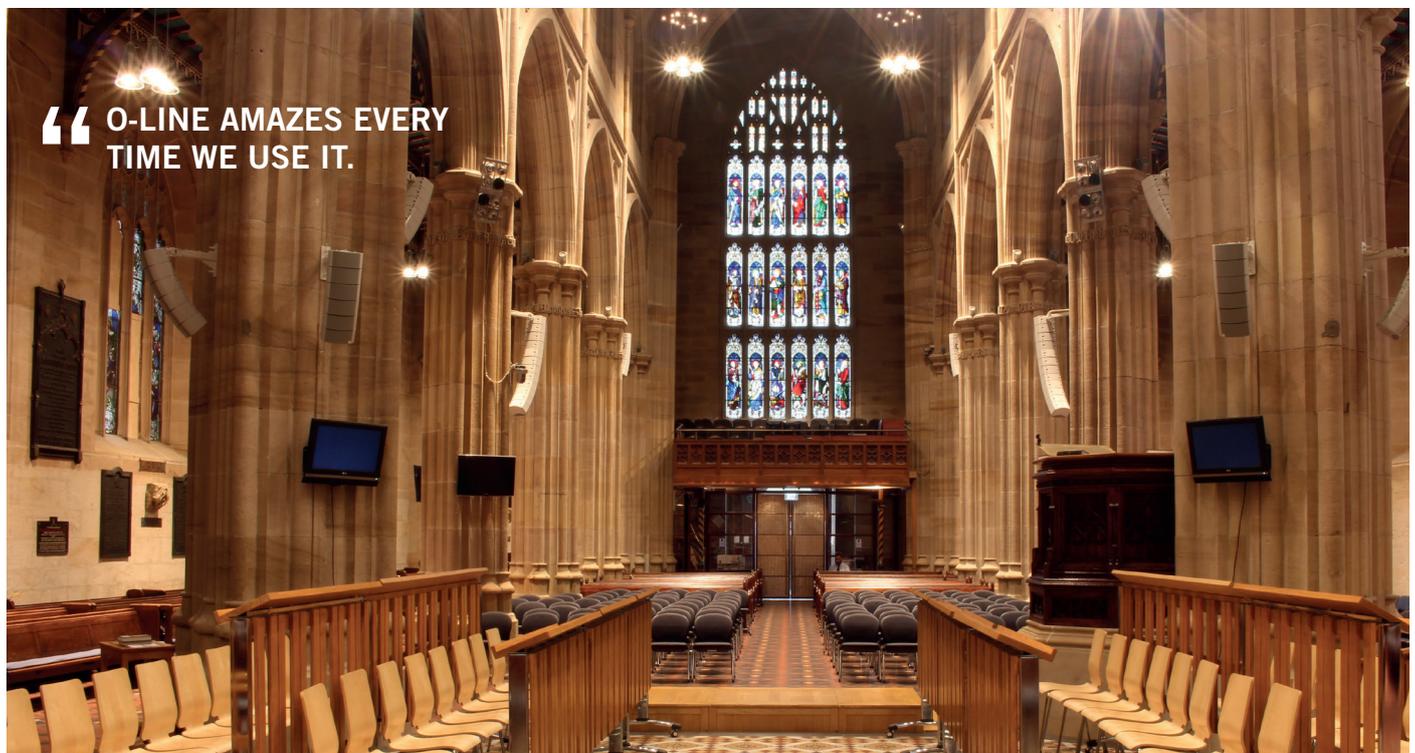
Wizard's design solution was to deploy an unprecedented 140 O-Line elements (distributed over 22 hangs) along with six Martin Audio AQ212 dual 12 inch sub bass. Not only was the quantity of elements enormous but so was the DSP control.

Having used O-Line in other reverberant environments they recognised that a unique aspect of the system is that not only can it be mechanically arrayed and aimed when used in passive mode but it can also be deployed in an MLA [Multicellular Loudspeaker Array] active configuration.

In MLA mode, each element in the array is separately amplified and processed using FIR filters, based on custom software. This enables the system to not only be mechanically and electronically steered but allows consistent frequency response throughout the listening area — without the lobing associated with straight columns.

O-Line is used in a combination of active arrays for the critical areas and passive hangs for spot fill, distributed across 60 channels of 200W-per-channel amps.

The main Western Nave arrays comprise two banks of 12 active O-Lines with a further two banks of 10 active



“ O-LINE AMAZES EVERY TIME WE USE IT.”

arrays for the outer north west pews, while the Eastern Nave comprises two banks of eight active elements with a further four positions of six active O-Line for the centre of the transept.

The sub bass system is floor mounted in two banks of three AQ212 with separate amplification and processing for each cabinet, which enables the low frequency to be electronically steered. According to TAG technical director, Anthony Russo, “Because O-Line has such an extended and usable frequency response to 75Hz the spectral balance between arrays and subs is even and consistent — a feature not normally associated with compact array and large bass system.”

TAG also recommended advanced DSP and enable the church to control the system with iPads, using custom designed GUI screens for simple services, or interfacing with the mixer and digital stage box for full scale services.

Other ingenious design features enable the pulpit's local O-Line — mounted a mere 500mm above — to be ramped down, panned and re-EQed to its opposite partner array via the use of an under-carpet pressure mat whenever a priest uses the pulpit with a live mic. O-Line's smooth response is such that only 6dB reduction was required to achieve the pass mark required for gain before feedback criteria.

As Glenn Leembruggen commented, “O-Line amazes every time we use it; the CAD and filtering predictions are absolutely usable; it's an amazing engineering feat; there is nothing I have ever worked with that comes close to this product.”

And Canon Chris Allen added, “This has not only been an extraordinary effort but the compliments from the congregation on the clarity of the system are never ending.”

O-Line Installed in Thane Catholic Church



St. John the Baptist Church, Portugal

Zoodio carries out major HoW Heritage sound upgrade in India.

St. John the Baptist, a Portuguese style Christian church situated in the Indian city of Thane, north of Mumbai, can trace its origins back 500 years. Having been declared a heritage site by UNESCO, it recently underwent a massive restoration project spanning 18 months, including a complete sound system upgrade.

The older system had consisted of multiple speakers that were spaced along the wall of the church, and neither provided suitable intelligibility nor venue coverage. With the extension to the church (enabling it to expand the congregation size to around 5,000 for Sunday mass), the parish priest had initially requested a demo from another vendor to provide coverage for the growing number of people. 'We were not very impressed with the sound,' admits Cleo Pereira, from Martin Audio partner Zoodio, who has been specifying the British brand for the past decade. 'Instead, we suggested the Martin Audio O-Line as a brand, since we use it in most of our installs.'

Zoodio's Dylan Hilton, who also happens to be one of the parishioners, co-ordinated the project. He set up a demo of this discreet, premium micro line array through integrated Entertainment Solutions (IES), the Martin Audio distributors. 'We suggested that this would do the

“ ‘THE O-LINE DID A PERFECT JOB IN REDUCING THE REVERBERATIONS WITHIN THE CHURCH

trick, at the same time reducing the number of speakers required and enhancing the overall worship experience.'

O-Line was duly adopted, with Zoodio supplying the components and their team of engineers, technicians and riggers worked on the fit out, to meet Dylan Hilton's specification, with four sets of O-Line (eight elements per side).

O-Line was supported with Martin Audio's CDD8 Differential Dispersion loudspeakers for the delays as well as in the corridors. 'The reason,' said Pereira, 'was that we had a lot of constraints from the Heritage committee; they wanted an extremely compact system that would not block any of the murals and paintings present in the church and also a system that sounded good.'

He also emphasised that this was the first time both the O-Line and CDDs had been used in India.

The biggest challenge had been rigging the O-Line as the walls of the church were not concrete but limestone - and so the utmost care and safety measures needed to be taken



during the mounting phase. ‘The O-Line did a perfect job in reducing the reverberations within the church as the limestone walls had no acoustical properties.’

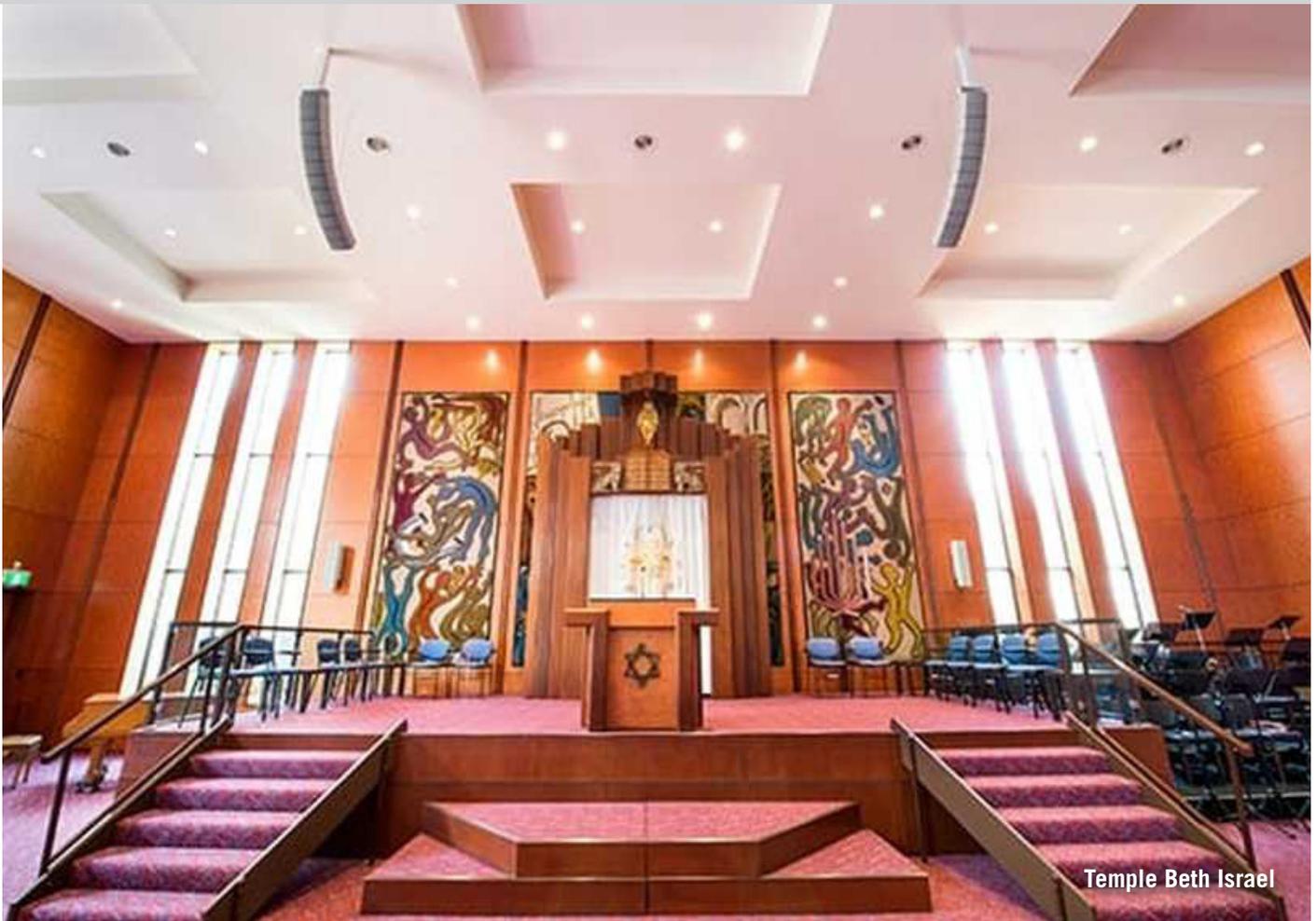
Feeding the system is a combination of six vocal mics for the choir, an acoustic guitar and keyboards, a podium mic for the clergy and three mics on the altar.

In conclusion, Cleo Pereira said, ‘Having dealt with all the sound challenges, and taken proper care to avoid any further issues, Zoodio has brought back the voice of the church once more.’

The Parish Priest, the Rev. Fr. Allwyn D’Silva is also delighted with the system, which he says provides him with excellent sound quality.



O-Line Solution for Temple Beth Israel



Since being founded in 1930, Temple Beth Israel (TBI) has been shaping Jewish life in Melbourne, and from a technological perspective has become the first synagogue in Australia to stream Shabbat services online.

However, its sound system had aged to the point where it was no longer meeting the expectations of its increasingly technology-savvy congregation. Aside from its poor directional control and inability to deliver sufficiently intelligible speech, the inflexibility of the system infrastructure was restricting the new clergy's creative development and exploration of new formats for services and events.

Thus the time was right to improve the usability of the Synagogue's Sanctuary spaces and provide the congregation with effortless listening conditions.

Rabbi Gersh Lazarow's vision for a modern, flexible worship space in combination with the strong musical aspirations of Cantor Michel Laloum led to the appointment of Hanson Associates as the acoustics and audio visual consulting engineers.

The consultants duly developed a performance specification for the new sound reinforcement system, identifying the products that would meet its challenging requirements. This resulted in integrators, Urban Intelligence, fitting a discreet O-Line micro line array from Martin Audio to provide the versatile solution required. The eventual

“ THE RESULTS WERE STUNNING. DESPITE THE LIVE ACOUSTIC IN SLOME HALL, CLARITY OF SPEECH WAS INSTANTLY RESTORED.

system comprised 4 x 12-element actively processed line arrays, supplied by Technical Audio Group, Martin Audio's Australian distributors.

The challenge had been to enhance the worship experience throughout the Main Synagogue and adjacent Slome Hall - two 'grand' spaces, with significant spatial volume, separated by an operable wall. In combined format these spaces host large services, state funerals and music performances, when it can then accommodate up to 1100 people. However, the space is generally subdivided, with worship occurring in the Main Synagogue and community events hosted in Slome Hall.

Confirms Hanson Associates' Mark Hanson, 'We nominated O-Line because computer modeling, conducted by the engineering team using Martin Audio Display software and EASE, proved it could meet the stringent electroacoustic performance requirements. The synagogue was also impressed with O-Line's small footprint and minimal visual impact.'

Furthermore, Hanson Associates were able to share experience of working with O-Line in similar acoustically

challenging environments. ‘We knew the extended linear frequency response and superior pattern control of the O-Lines across a large listening area, and their ability to minimise acoustic energy ‘spill’ onto reflective surfaces, would guarantee a high level of system stability for a wide range of room formats,’ Hanson confirms.

Via Martin Audio’s Display 2 software his company was able to model several scenarios and develop the final coverage pattern (and angles) for each line array configuration.

‘Where many traditional line array systems rely on passive arraying of line array elements, and the overall splay angles of the configuration to achieve a best possible coverage pattern, the optimised filters generated by the Display software enable an actively driven array to achieve drastic improvements in coverage and consistency across target listening areas,’ he continues. Hanson cites the importance of specifically generated linear phase FIR filters for each of the 48-line elements in the four line array configurations to achieve a highly consistent seat coverage across all frequencies, while achieving impressive rejection of sound onto the stage and towards the upper balcony rear wall.

Another advantage was the variable beam steering presets that were implemented for the Slome Hall line arrays - both with and without the operable wall retracted.

During large services and events, the operable wall is retracted and the two pairs of O-Line arrays are used in a main FOH and delay configuration. However, for most of the year, this wall is extended to separate Slome Hall from the Sanctuary. ‘Via the Display software, a second set of FIR filters was exported into an audio DSP preset to generate an entirely different pattern from the same

physical array which cuts off sharply at the operable wall at the rear of the room.

‘The results were stunning. Despite the live acoustic in Slome Hall, clarity of speech was instantly restored and the system was able to readily support day to day events at the tap of a touch screen.’

Each O-Line hang was supported by custom bracketry, designed in conjunction with Urban Intelligence, to maximise the final tilt angles and allow cables to be concealed.

‘With the control afforded by O-Line, we have been able to achieve musical clarity and speech intelligibility - despite the reverberance,’ says Hanson. ‘We have also avoided the need to implement under-balcony fills, and all sightline requirements have been met.’

In conclusion, he says, ‘The stability of the electroacoustic system, the success of the microphone and DSP mixer sections, and intuitive tablet user interface for the clergy has meant that complex services and events can be conducted involving multiple speakers and musicians without technical staff and sound engineers, as has been the case previously.’

Finally, the consultant credits other key personnel in the project including Mark Thompson of Hanson Associates who led the modelling work and undertook commissioning with David Gilfillan of Gilfillan Soundwork; Martin Audio’s Ambrose Thompson, for ongoing Display support as Hanson pushed the software and system to its limit; Urban Intelligence director, Lior Rauchberger, and site foreman Toby Leader.



AVE Upgrades First Baptist Church with O-Line



Temple Beth Israel

St. Paul, MN—Audio Video Electronics (AVE) recently completed an upgrade of the historic First Baptist Church of St. Paul. Understanding that a successful church is all about an engaged congregation, no matter where they sit or what style of worship, this sophisticated new sound system was based on a Martin Audio O-Line micro-line array system.

First opened in 1875, the First Baptist Church’s structure has a peaked roof over 40 feet high with embellished wooden buttresses and a spacious sanctuary dominated by a large and elaborate pipe organ. This classic house of worship aesthetic and the historical significance of the sanctuary meant the audio upgrade could not intrude on the building’s traditional appearance.

Making this project more of a challenge was the fact that First Baptist houses different congregations. As AVE President Stefan Svård points out, ‘The needs of the three congregations were quite different. The original church in the building is more liturgical in nature with a beautiful organ and more of a spoken word style. The other two congregations have modern worship bands with drums, keyboards, amplifiers and guitars.’

This was further complicated by many hard reflective surfaces that wreaked havoc on the acoustics of the modern praise and spoken word in general, while actually working well for the organ. Existing sound solutions provided something loud at the front, but with the sound

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and intelligibility greatly diminishing further away from the front rows.

‘Getting a system in there that would not only provide excellent intelligibility for the spoken word but also modern praise is not easy with these kinds of buildings which are more reverberant,’ Stefan continues. ‘We’ve done projects like the Basilica of St. Mary’s in Minneapolis and the cathedral of St. Paul that have five second reverb times where we used steerable line array column speakers, but those are not the most ideal for contemporary music.

‘All of which explains how we came to the Martin Audio O-Line. It’s a good-sized line array system that is slender, attractive and has exceptional fidelity. I’m quite particular about audio, and the fact that we were able to achieve absolute consistency of sound quality and a very clean frequency response from front to middle and back is amazing. O-Line was very smooth and natural sounding, very clear and was able to handle the contemporary music just fine.’

The rest of the audio system includes a Behringer X32 digital mixing console housed in an HSA roll-top desk

with a Behringer S16 16-channel digital snake. The whole system is run through a QSC CX404 4-channel amplifier housed in an equipment room near the pipe organ. The Behringer mixer is used to mix contemporary worship bands, while the QSC provides an automatic mix for more traditional services.

As with most traditional House of Worship upgrades, aesthetics was a critical issue.

Stefan explains that ‘a lot of the projects AVE does are either going to be a wall-mounted line array system which doesn’t provide the output level for the contemporary worship side. Or we’re going to do a large point source box, which is a problem because in order to have pattern control they need to be big. And we have that nice organ and the architectural embellishments with the lighting to make the sanctuary really pop, so we just didn’t have the space for that kind of a speaker system.’

Concluding, Stefan adds, ‘That’s why the O-Line offered a really fantastic solution because it’s compact and the color actually matched the walls so it literally blends into the space and works really well, so we and the Church are really pleased with the results. The whole combination of the system being sensitive to the architecture with the exceptional audio performance, I really feel like we hit a home run with this one.’



MISCELLANEOUS

Pure AV Meets Museum Challenges With O-Line



The Museum of Science

Situated on the site of the world's first railway station, built in 1830, The Museum of Science and Industry in Manchester is a large museum devoted to the development of science, technology and industry, with emphasis on the city's achievements in these fields.

Also based in the north-west, system integrators Pure AV, who had already carried out past work for the client, were again introduced to provide a sound reinforcement in one particularly challenging area within the Power Hall, and turned to a Martin Audio O-Line solution, as they have many times in the past.

They were tasked with providing an audio system in a giant, loud ambient room within the Power Hall used for presentations to the general public. The area shows a locomotive with the side cut away while the presenter explains the workings of a steam engine. The audience is positioned in a viewing area opposite the engine and the hard

surfaces of the building and extreme engine noise create a very difficult environment for a microphone presentation.

In order to overcome the noise of the steam engine without blanketing the whole area with sound it was necessary to create a focused area directed at the audience. The solution was to place two hangs of six O-Lines at high level either side of the steam engine. This enabled Pure AV to implement the correct angle of the sound over the audience, where it could effortlessly punch the sound into the midst without providing excessive spillage to other exhibits.

Tony Crossley, Pure AV's Pre-sales Technical Director, admits, 'Our previous experiences with O-Line gave us confidence that the system had the capability to meet the demands of the environment - in particular the ability to control the spread of sound and deliver a clean listening experience for the audience.'



‘Using the O-Line modelling software we were not only able to focus the sound on a fairly tight audience area but also look at the predicted SPLs elsewhere in the gallery. This enabled us to play around with the height and angle of the array to really fine tune the coverage whilst minimising unwanted spill into other areas.’

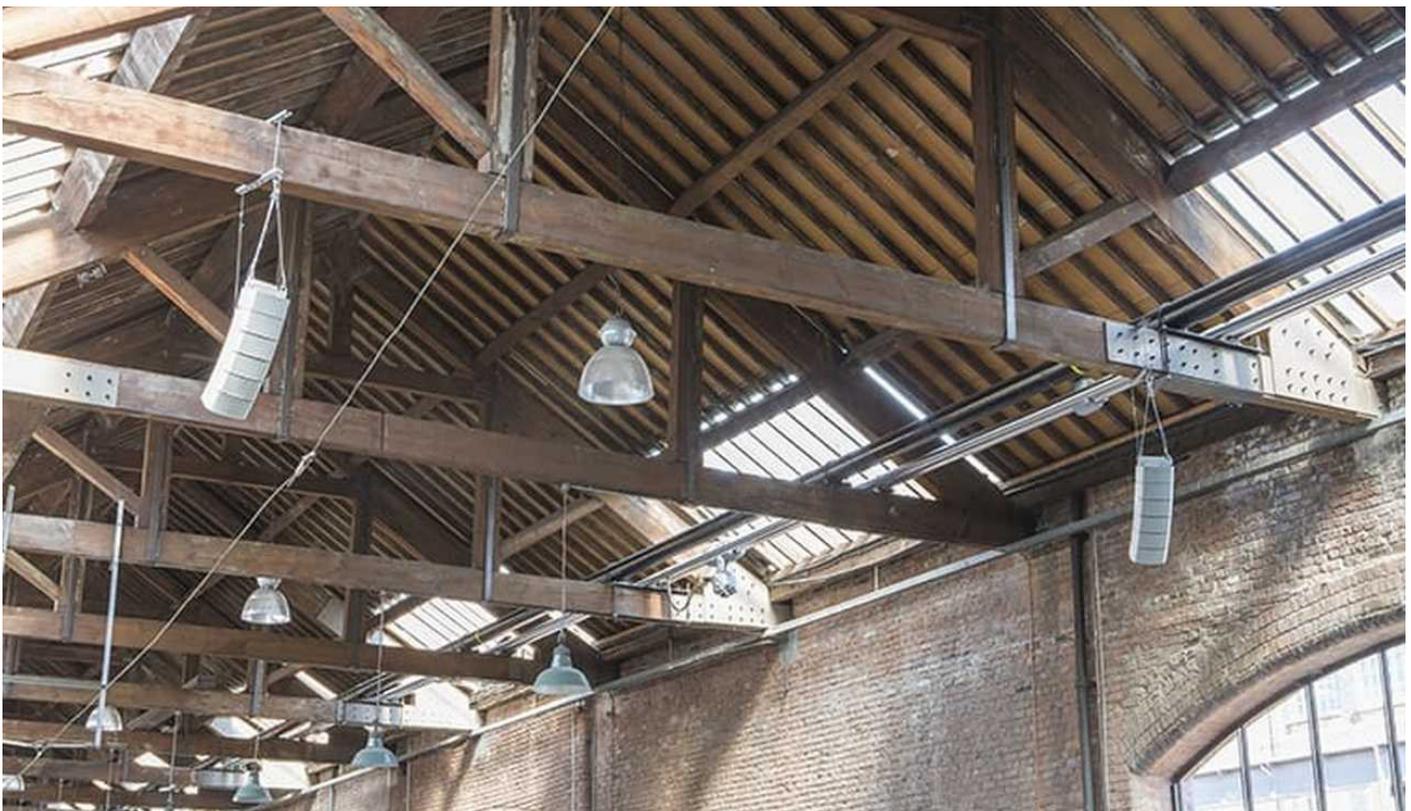
The digital signal processor allowed them to adjust the audio to deal with acoustic challenges.

The feedback from the client was equally positive, with Interim Explainer Team Leader, Shea Taylor, also waxing lyrical. ‘One of the main challenges of presenting in the Power Hall is trying to engage the audience whilst the steam engines are running and other visitors are looking at our collections. We have to perform over all this noise, and since this is an historic building with high ceilings, it’s not the best for acoustics.

“ THE AUDIENCE FEELS FULLY IMMERSSED AND ISN'T DISTRACTED BY THE REST OF THE GALLERY.

‘Prior to the introduction of the audio system we basically had to project as much as we could, which could sometimes be a strain on the voice. Although we always succeeded in keeping the audience engaged, it meant us competing with our environment and all the other noises and sounds of the gallery,’ continued Shea.

‘The installation of O-Line has helped us so much because it has allowed us to take a more relaxed approach now that we no longer have to compete with the other sounds. The audience feels fully immersed and isn’t distracted by the rest of the gallery; visitors are completely embraced by the sound within the performance area and it feels like a separate show space.’



O-Line Conquers High Reverberation in Sydney

A Martin Audio O-Line® system has been specified and installed at Central Railway Station in Sydney, the largest in Australia, to conquer a speech intelligibility problem that has persisted for years.

The Country Trains Concourse, measuring 110m x 60m x 10m, and with a challenging RT60 time of 5.5 seconds in the mid-band, has long defied attempts to get intelligible announcements heard by commuters. Over the years many brands have successively tried and failed to tame the inherent reverberation caused by a combination of terrazzo floors, sandstone and plate glass walls and a high arched steel roof.

Last year Glenn Leembruggen, principal of Acoustic Directions, became the latest specialist to do battle with the acoustically hostile environment.

Since acoustic treatment of the inside of the roof was ruled out as being financially untenable, two members of the Acoustic Directions team, David Connor and David Gilfillan, decided to trial several software-driven systems, and investigate different steerable line array solutions.

They ultimately concluded that a Martin Audio O-Line system, with DSP processing, would produce the best quality and best speech clarity. They duly specified 120 steered elements - supplied by TAG, Martin Audio's Australian distributors.

Modular and scalable, this particular O-Line installation used a special version of the Martin Audio Display software (operating under an FIR filtering regime that addressed every element in the array with its own processed channel). The intelligent software enabled the array to be configured to deliver sound precisely over the venue's vertical profile without spillage. Furthermore, elimination of high-frequency side-lobes gives O-Line an advantage over conventional



Central Railway Station, Sydney

DSP steered columns making it suitable for high quality speech and music reproduction even in reverberant spaces such as railway station concourses.

Thus Acoustic Directions were able to simultaneously optimise the direct field over the listening area, keep the sound off reflective rear walls, and minimise reverberant sound power. The result is remarkably high intelligibility throughout the concourse, even at rush hour, when as many as 3,000 passengers are adding to the cacophony of noise resonating around this vast cavern.

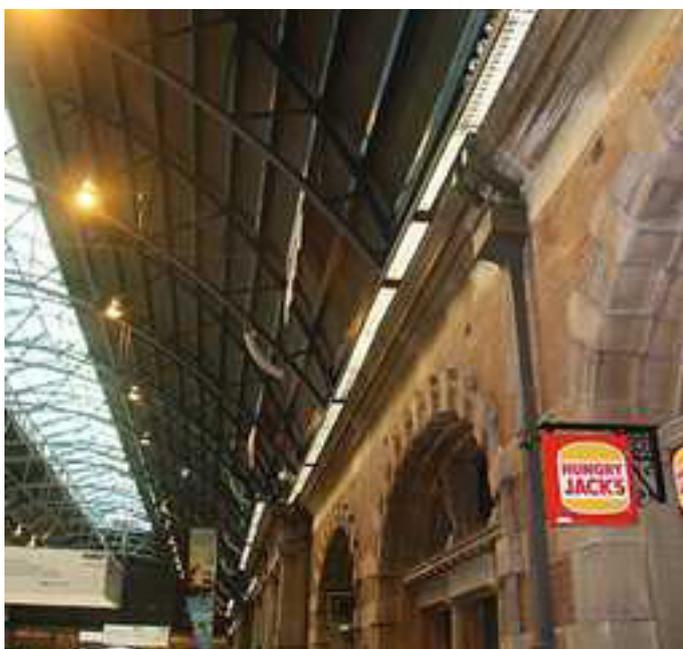
With the amps situated as much as 200m away from the speakers, a 100 Volt system was required, and Acoustic Directions worked with Harbuch Electronics to develop a 100V loudspeaker transformer that was ultra-flat and with only 10 degrees of phase shift at 20kHz. The FIR filters that beam control the array are implemented in Nion processors with the loudspeakers being driven by 8-channel 2.4kW amplifiers (to provide 120 amp channels).

Acoustic Directions optimised the frequency responses over the listening area using time-windowed impulse responses.

The installation also picked up a coveted Rutledge AV Industry Award (an AVIA) with the judges commending Acoustic Directions' meticulous implementation of the modelling, installation and commissioning of the system.

As a result, for the first time not only can amplified speech be easily understood in any part of the concourse, but music and pre-recorded messages sound natural and clear - and roaming hand-held wireless microphones can function without fear of feedback.

In fact, such is the confidence inspired by this new solution, that special events, promotions and even live music events are being hosted at Sydney's Central Railway Station ... using the house system!



First O-Line Goes into High-Glamour Kingly Club



Kingly Club, UK

Systems Etc fit out three-storey venue with Martin Audio rig. The first UK installation of the new award-winning O-Line™ Micro Line Array from Martin Audio has been installed in the stunning new, three-storey, glass-fronted Kingly Club in London's Covent Garden.

The scalable system was specified by Bernard Mani, head of London integration company Systems Etc, after witnessing its launch at PLASA 2007 and seeing it immediately adopted in America for Star Trek® The Tour - billed as 'the largest interactive Star Trek exhibit ever.'

The Kingly Club is the brainchild of entrepreneur Dezzi Mc Causland, founder and creator of the original award winning members club of the same name in Soho - on which Systems Etc also worked.

The new operation in St Martin's Lane consists of a contemporary Japanese restaurant, Kyashii, a lounge bar, a VIP mezzanine area and al fresco seating during the summer months.

Overlooking the ground floor with a private bar, DJ and the largest floor to ceiling screens of any bar in Europe, the VIP mezzanine area offers fabulous views over the lounge bar and onto St Martin's Lane. Downstairs, the restaurant comprises three dining rooms, the Blue Room, The White Room and the Chef's Table.

Providing even sound coverage provided a real challenge for Mani - although he already had experience of the space, since he had provided the sound system in the building's earlier incarnation (as Denim). 'This time, not only did we have to provide even distribution through three floors but the system needed to be tiny and discreet - in fact Dezzi wanted the components to be near-invisible.' It was important that the sound reinforcement blended in with the high-glamour design concept created by the owner himself, and architect Phillip Watts.

Bernard Mani said he had investigated just about every product catalogue, but when he and Mc Causland visited Martin Audio's High Wycombe HQ they knew they had found the answer. 'He was completely sold on the looks,' says the installer.

Thus the main system comprises seven hangs of four O-Line boxes - some flown from the ceiling and some wall-mounted.

Full range infills are provided by Martin Audio's architecturally-designed white C115's with 11 mounted to the wall, along with a combination of 17 distributed C4.8T's and two C6.8T. ceiling speakers.

Likewise the floor-mounted sub-woofers needed to be invisible and both the eight CS265's on the ground floor and three AQ series AQ210 (2 x 10in subs) in the mezzanine have been concealed within the furniture carcassing.

Special dispensation was made for the Martin Audio Blackline F10 which forms the DJ's reference monitoring in the highly-specified booth - as this does have a strong muscular presence.

In order to balance the levels of the source inputs - with different DJ and background music feeds - Systems Etc have once again used Martin Audio's new Engineer 418 DSP, as they did recently at Pacha Victoria, working in conjunction with a separate zoner, which distributes the sound to 14 different zones. Any containment issues have been dealt with by clever soundproofing - with added insulation and double-glazed skylights.

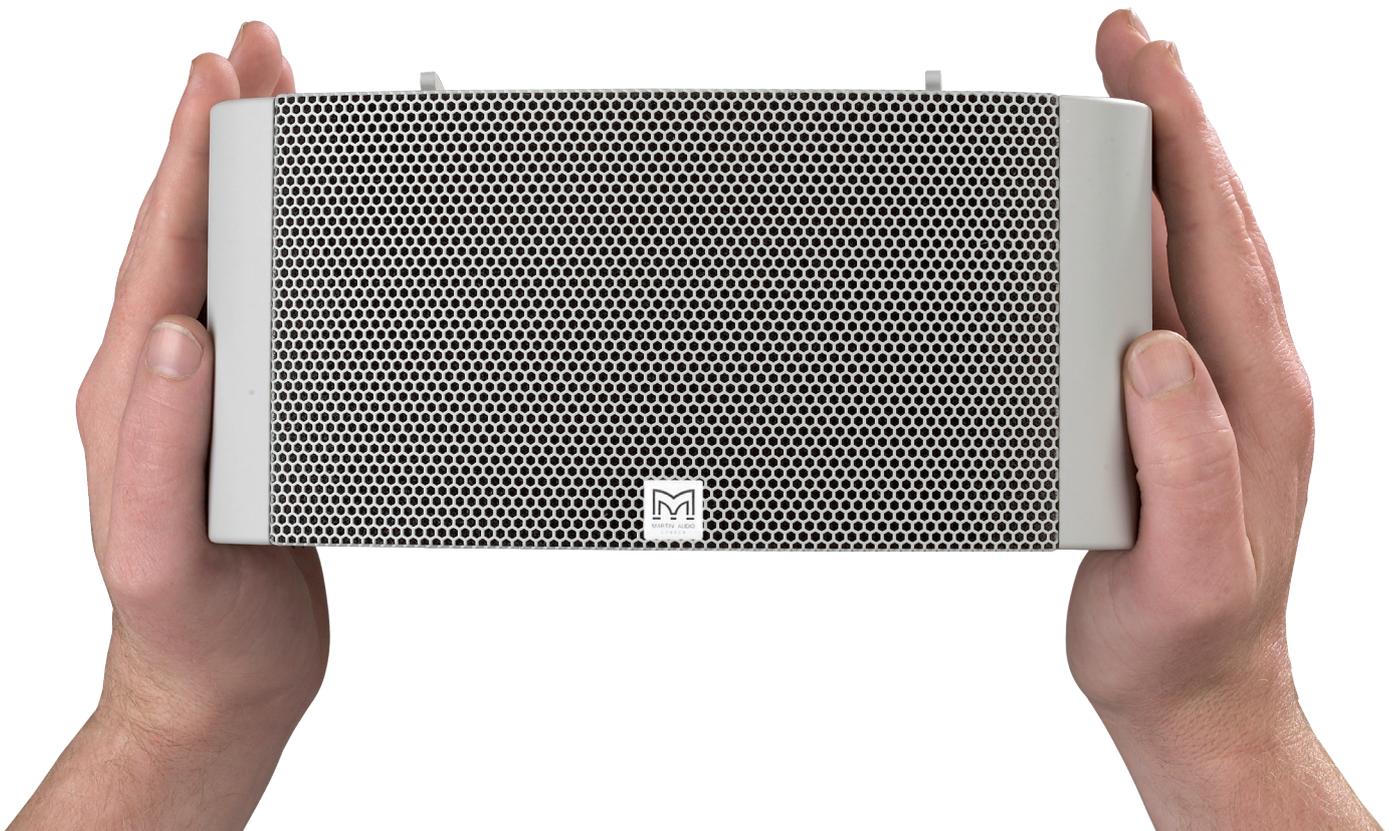
Summarising the installation, Bernard Mani says, 'O-Line is great looking kit and it really works - delivering the right SPL. Everyone at the venue is delighted.'



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