

CASE STUDIES

Educational Facilities



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 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.



The Great Hall, Bristol University, UK

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.

MLA Mini Chosen for Oslo Uni's Famous Aula

A Martin Audio MLA Mini Multi-cellular Loudspeaker Array has been installed at the University of Oslo (UiO) flagship auditorium - replacing the previous PA system.

The integration was carried out by Atendi AS, Martin Audio's pan-Scandinavian distributors, and the installation itself is in the Aula, the University's famous ceremonial hall, known for its festive events, concerts and art. In fact from 1947 until 1989 it hosted the Nobel Peace Prize, but when that auditorium gradually became too small, the ceremony was moved to the Oslo City Hall.

The Aula's connection with Nobel today revolves around the Nobel Lecture, which is frequently presented there, while many other civic dignitaries also give lectures. In addition, the Aula is used for a number of high profile events such as the Oslo Opera Festival, as well as classical concerts ranging from the Norwegian Radio Orchestra 70th year jubilee concerts to small jazz concerts.

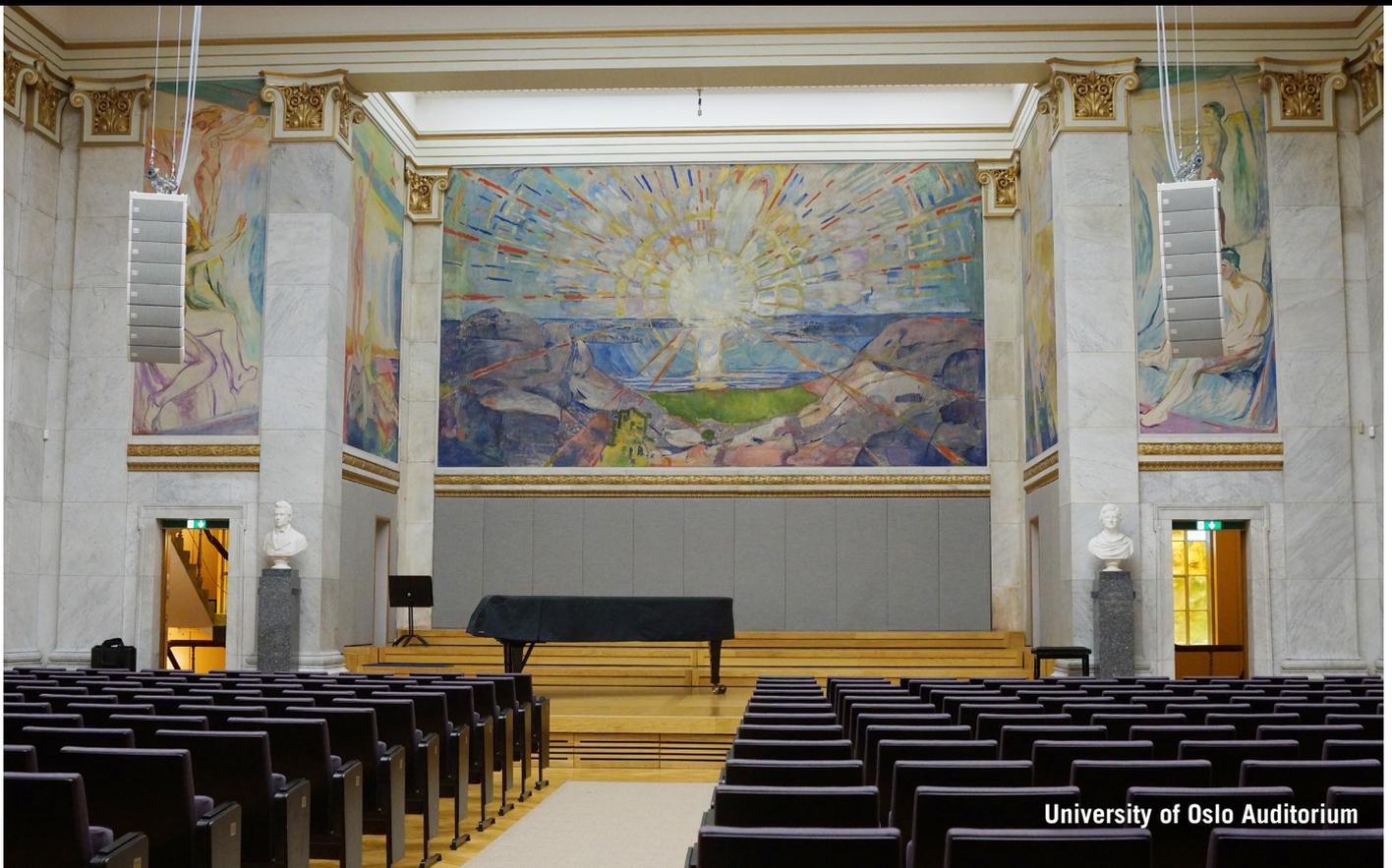
According to Øystein Wierli, Head of Audio Sales at Atendi, this is the conclusion of a long-running journey, which began nearly two years ago. During the bidding process

six speaker brands were invited to conduct demos, with Atendi successfully auditioning the award-winning Martin Audio MLA Mini at the end of September 2015.

COWI Norway was the specialist consulting company, and Geir Kristoffersen, Head of Section Acoustics, Noise, Vibrations, Electroacoustics, Stage and AV, produced system specifications in collaboration with the technical crew at UiO and colleagues at COWI.

“ MY FIRST IDEA TO SOLVE THE PROBLEMATIC ROOM, WITH ITS LONG REVERB TIME, WAS MLA MINI.

Having had experience working on concerts in the Aula some years ago, Wierli knew the task he faced. 'My first idea to solve the problematic room, with its long reverb time, was MLA Mini. The venue itself has a glass ceiling, a wooden floor and marble walls decorated with Munch paintings. This makes it acoustically very challenging.'



University of Oslo Auditorium

However, MLA Mini was only adopted after intense testing and measurements conducted in September last year by COWI, but consistently MLA Mini provided the system with the most even coverage.

‘One of the requirements was that the PA system needed to be supplied in white in order to minimise the attention the loudspeaker system normally commands in a setting like this,’ Øystein continued, ‘with consistent coverage throughout the whole venue being a further prerequisite.’

During commissioning, it was very obvious that a distinct ‘slap-back’ echo could be heard in the front row of seats from the upper balcony at the rear of the hall. By using MLA’s unique ‘Hard Avoid’ feature, it was possible to reduce the energy in that part of the room, losing the distinct echo completely.

The new PA design is based around eight MLA Mini and two MSX subs each side of the stage. Atendi also installed a front fill system consisting of four DD6 speakers, a delay system comprising a further pair of DD6, with two more DD6 as floor wedges. All amps were installed in a single rack in the attic above the Aula.

The new PA rig will now be used on a daily basis, as the Aula conducts guided tours of the venue (the attraction being the Munch paintings). Hence the tour guides will also use the new MLA Mini for speech reinforcement. In addition, the venue will also host concerts, receptions, press and media events, and so the sound system will be subjected to an arduous duty cycle.

The installation was project managed by Atendi’s Lorry Kristiansen and Øystein Wierli himself, while Martin

Audio’s Product Support Engineer, Robin Dibble supported both the demos last year and the commissioning. ‘He is a fantastic person to have on jobs like this,’ Øystein enthuses, ‘and the success of this project has meant that MLA Mini in white will be an ongoing available variant from Martin Audio.’

As for the Martin Audio distributors, Atendi Norway started out in 2010 as Elektrik Solutions, before changing their name at the beginning of this year. They formed a joint venture with Bico in Copenhagen, and also opened an office in Gothenburg at the beginning of this year. So the Atendi name is now consistent throughout the Nordic countries, with distribution of Martin Audio beginning in September 2015.



WPM for Australian University's Great Hall

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.



University of Newcastle's Great Hall, Australia



“ 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.

“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.”

TORUS The Perfect Solution for Tsukuba's Capio Hall



The Tsukuba Capio complex in Japan's Tsukuba city, Ibaragi, incorporates indoor sports halls, theatres and meeting rooms, while Tsukuba itself is renowned for being a scientific city of the future city. Opened in July 1996, Capio Hall has provided an authentic atmosphere for theatre and dance, with its distinctive seat arrangement and high-quality stage facilities.

Capio Hall recently underwent a major sound system overhaul, and new rigs were introduced, including the new Martin Audio TORUS as the main PA.

Nobuhito Endo, technical manager of rental company Sigma Communications, who support the theatre, set out the reason for the upgrade and his choice of TORUS.

“Originally, the proscenium centre loudspeakers were exposed, and a cluster of several point-source systems was flown from the grid. Naturally, we considered utilising a line array replacement but found a problem. While the hall wasn't very deep, the three-storey horseshoe layout of the auditorium was vertically too great for the coverage angles.

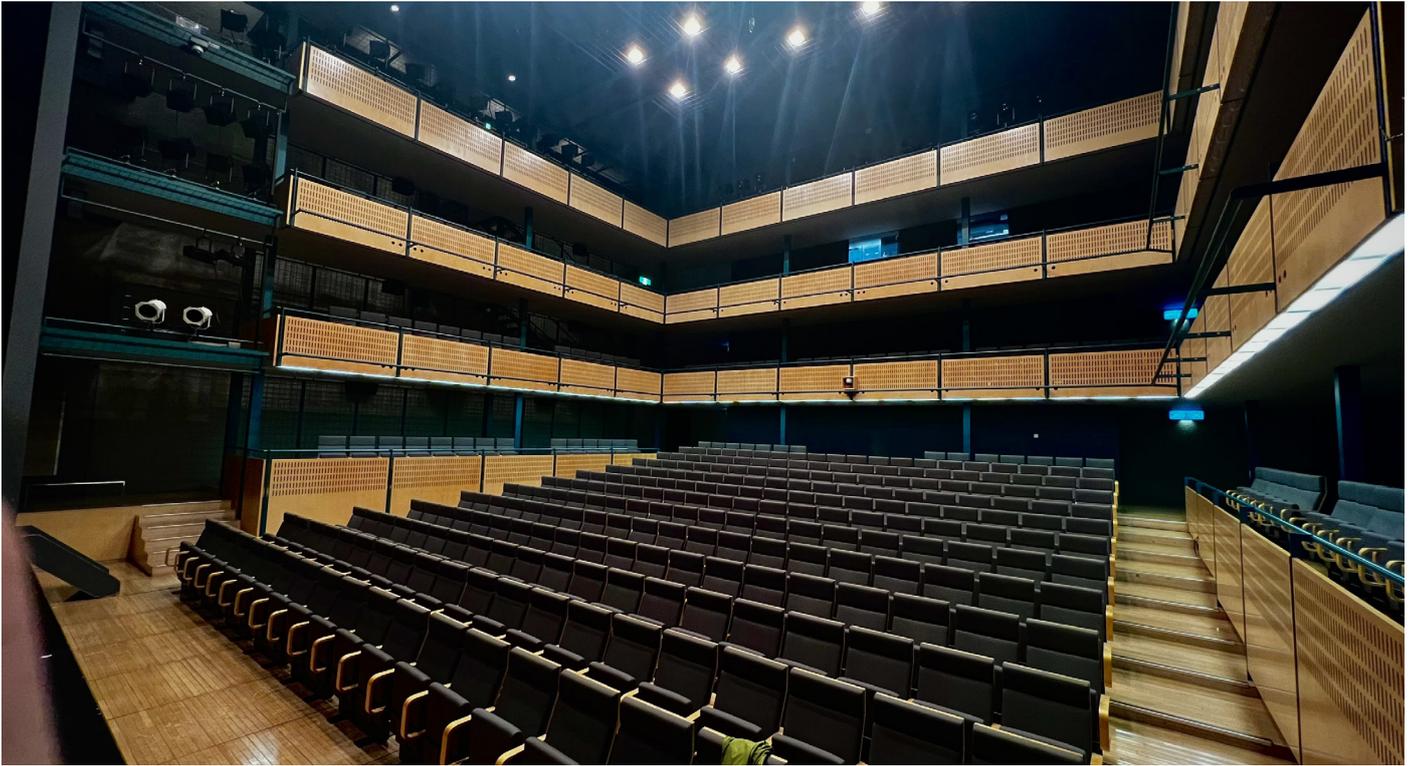
“It was quite clear that a considerable number of line array cabinets would be needed if we wanted to provide complete vertical area coverage from its highest point, without converging on the frame of the stage.”

It's then that the Constant Curvature array solution came to mind. In venues with high ceilings but requiring short

throw Martin Audio's new TORUS rig offers a practical solution. Full-blown line arrays would be impractical and cost-prohibitive for a 15- to 30-metre depth hall. However, a point source solution such as this would provide sufficient coverage and SPL. As a constant curvature array TORUS is designed to completely compensate all the gaps by combining optimised coverage, perfect SPL and cost efficiency.

During the renovation process a vertical array comprising four cabinets—two each of the T1215 and T1230, offering 15° and 30° vertical dispersion respectively—were deployed in grids at the proscenium to cover the vertical 90°, angled to deliver the sound from the third floor to the front seat of the first floor. Furthermore, a Martin Audio XD12, supplemented by SX118 subwoofer, was specified for the side column and powered by iK42 DSP amplifiers. For infills and balcony seats, six Blackline X8 were deployed.

Takahisa Ota, who was responsible for the tuning of the system, said, “Originally, we planned a front wide / back narrow dispersion pattern, but as we adjusted this while listening to the sound, we discovered that specifying everything to a horizontal 90 degrees would give a better coverage. In that way, the proscenium could cover 80% of the venue. We adjusted the delays and SPL of the Blackline X8s so that they were blended to the proscenium, to cover the remaining tiny area. You can adjust the angle



of the TORUS waveguide even with grills attached and this flexibility is such an advantage in situations like this.”

Mr. Endo concluded, “Capio Hall has to meet the requirements of various types of public events. Recently, students’ dance presentations have been taking place frequently, and consequently a higher level of sound pressure has been required. In this application, TORUS and the subwoofers have enough headroom to cope, and I am extremely satisfied with the choice of the new sound system.”

“ YOU CAN ADJUST THE ANGLE OF THE TORUS WAVEGUIDE EVEN WITH GRILLS ATTACHED AND THIS FLEXIBILITY IS SUCH AN ADVANTAGE IN SITUATIONS LIKE THIS”.



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.



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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.

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‘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.

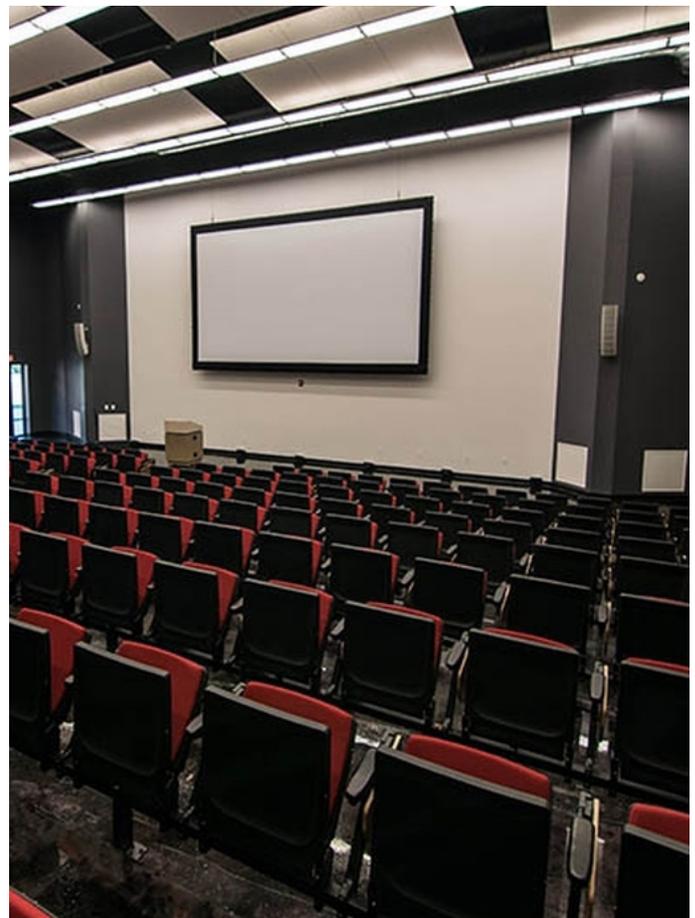
‘We needed a speaker system that could easily cover anything from one professor with accompanying video or PowerPoint presentation to a theater for films and a concert space for electric bands and small acoustic ensembles. So, we had to put in a sound system that was capable of handling anything we could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



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.”

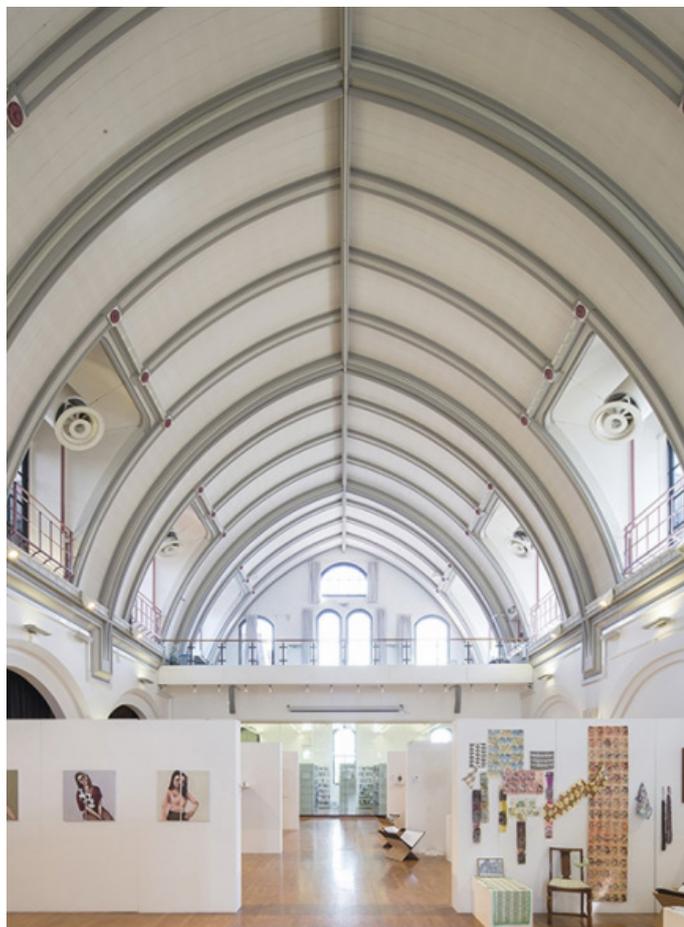
Word spread fast and other educational establishments were quick to follow. Immediately impressed with the Energus install had been Redcar & Cleveland College, where their

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."

O-Line Meets Pure AV's Stringent Lecture Theatre Challenges



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Keele University

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

The University of Cumbria's site at the Energun building in Workington is the place where Pure AV's O-Line journey began around five years ago.

Pure AV was approached to provide a complete AV solution for their state of the art training facility in Lillyhall campus, Cumbria. “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 — due to the auditorium being round with a roof that 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 were able to demonstrate to the client that good quality front of house sound reinforcement could be achieved without excessive spill — both into the ceiling void and the presenter area.

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

Word spread fast and other educational establishments that fell under the North West purchasing scheme were quick to follow.

Immediately impressed by had been Redcar & Cleveland College, where their Energun performance space and conference room was soon boasting a similar pair of eight-cell O-Line hangs — a perfect dynamic range solution for a multi-functioning space.

Other sites quickly followed. At the 264-capacity Main Arts

Lecture Theatre (MALT) at Bangor University Pure AV once again turned to O-Line to provide both vocal and sound reinforcement. They designed an L/C/R O-Line set-up with a central hang of four elements flanked by two six-box hangs having demonstrated to the client that the Martin Audio line array technology could provide even coverage and excellent intelligibility across the theatre, 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 some interesting issues. The building is entirely built of wood and understandably had some 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 over for the day the room is turned into the student cinema. Again, two eight-element hangs of O-Line, with a little low end reinforcement, met all the requirements perfectly.

And the success continued apace. Liverpool 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.

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 distributed system was simply exciting the room too much, says Colin Hasted. 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-Line installed, the facility can host everything from lectures to live performance.

At University of Manchester, Pure AV replaced the existing line array which, although it had the volume required to fill the room, didn't have the directivity needed to tame the poor reverberant acoustics in the University Place building, with its high roof void. Instead they designed a system for the 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-Line are complemented by twin six-cell O-Line at the midpoint 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-Line 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 8-cell system for one of its major lecture theatres.

In addition there is a further pair of eight O-Line hangs cross firing from the centre to project sound to the under-balconies. "As with all our installations we use SMAART system alignment, with the speaker management handled in the DSP," states Hasted. "This ensures that the systems are fully optimised."

Following on from the success with the North West Universities, Pure AV also equipped the 260-seat lecture

theatre at Harper Adams University in Telford with two hangs of eight-element O-Line, cross firing to squeeze the sound under the existing balcony.

Summing up, Colin Hasted says that thanks to O-Line, Pure AV have helped put the 'A' into 'AV' by establishing such a superior solution as O-Line 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.

"It's great that you can either fly or wall-mount these, and of course there are no loading problems as the volume to weight ratio is stunning."

Essex University, UK

A Martin Audio O-Line system was recently installed in the Ivor Crewe Lecture Hall (ICLH) at Essex University. Supplied by LMC Audio and installed by Scan Audio, the micro-line array system was identified as being the perfect solution, from the word go.

The decision was rubber stamped by Tessa Rogowski, Head of Customer Services, Information Systems, at Essex University. "I first saw the product at ISE and spoke with technical staff from Martin Audio about the specific problems we have with the 1,000 seat lecture theatre — namely hard surfaces, and the fact that the only place to hang speakers was behind the microphones, causing the resultant feedback headaches."

She continued, "There was no question in my mind that this difficult problem needed to be solved once and for all. Martin Audio were the first people who actually appeared to understand my problems, and had the technology to ensure that the installation would be carried out correctly, first time."

The resulting O-Line sale of 64 elements was handled by LMC Audio London, where Technical Sales Supervisor, Sam Simon-Norris, oversaw the project.

Following an initial visit from Martin Audio's Peter Child to discuss O-Line, it quickly became obvious to him that this was the perfect system to install at the ICLH. "With fantastic sound and sleek styling, I could see that it would complement the contemporary nature of the building brilliantly," he stated.

The O-Line system will primarily be used for voice amplification in the theatre, which is used for high profile graduation ceremonies, conferences and lectures. However, a further challenge is that the theatre can also split into two self-contained 500-seat spaces when the positioning of the speakers would automatically change, since they are hung on the walls that would move during the transformation.

This was addressed by Nigel Meddemmen, Martin Audio sales support, who carried out venue predictions as an accurate 2D slice using the O-Line Software. The calculations enabled him to position the arrays to ensure best possible response and generate the required rigging, inter-module angles and equalisation. These peculiar challenges, he noted, "actually made O-Line an excellent choice."

Other challenges included the use of a variety of microphones in front of the PA system — including tricky omnidirectional lavalier mics, which tend to be favoured by university lecturers — plus the insistence on wall-



Essex University



MUSIC REPRODUCTION WAS SURPRISINGLY FULL RANGE FROM SUCH A COMPACT LINE ARRAY.

Essex University

mounting the arrays as the roof structure had not been rated for a flown system.

The biggest problem posed, however, was the fact that the rear walls of the hall move — splitting the auditorium via a central removable divide when it needs to open up. A total of four O-Line arrays were specified to cover each of the two sides, and yet maintain pattern control across exactly the same area when the room is functioning as a single large space. However, the front wall in each of the two halves is hinged, and when moved backwards, would swing the outside arrays inward to leave gaps in the coverage at the sides whilst producing a troublesome coverage overlap in the centre between the two ‘inner’ arrays.

The solution was to fix the vertical coverage of the arrays but to leave a degree of play in the horizontal alignment which would normally be tightened off once commissioned to prevent any movement. An ‘angle stop’ system was therefore designed to slot behind the standard O-Line wall mount brackets, to make it easy to accurately reposition the arrays when the room configuration changes.

Summarising Sam Simon-Norris said, “Nigel’s solution for overcoming the two-zone problem was as ingenious as it was practical – utilising an additional bracket to allow the arrays to be swung from one position to another, giving optimum coverage in both modes. This really was a breakthrough for the project, and left us with no doubts that this system would be the perfect choice for the ICLH.”

For the installation itself, Simon-Norris chose long-standing LMC Audio client Scan Audio, to carry out the work. This was carried out over four days, including one day to decommission the existing large custom column speakers and a small line array.

The company’s William (Dee) Couchman commented, “The software setting provided by the design software required

only minor adjustment to produce a clear intelligible sound for this mainly speech-based reinforcement system,” he continued. “Music reproduction was surprisingly full range from such a compact line array, which blended very well with the interior of the hall.”

Nigel Meddemmen also confirmed that O-Line had proven to be an excellent choice for this application. In addition to solving the University’s sound problems he notes that O-Line is also visually unobtrusive, the curved lines and neutral grey colour helping the system to blend, and not detract from the focus of the venue ... in this case the university lecturers.

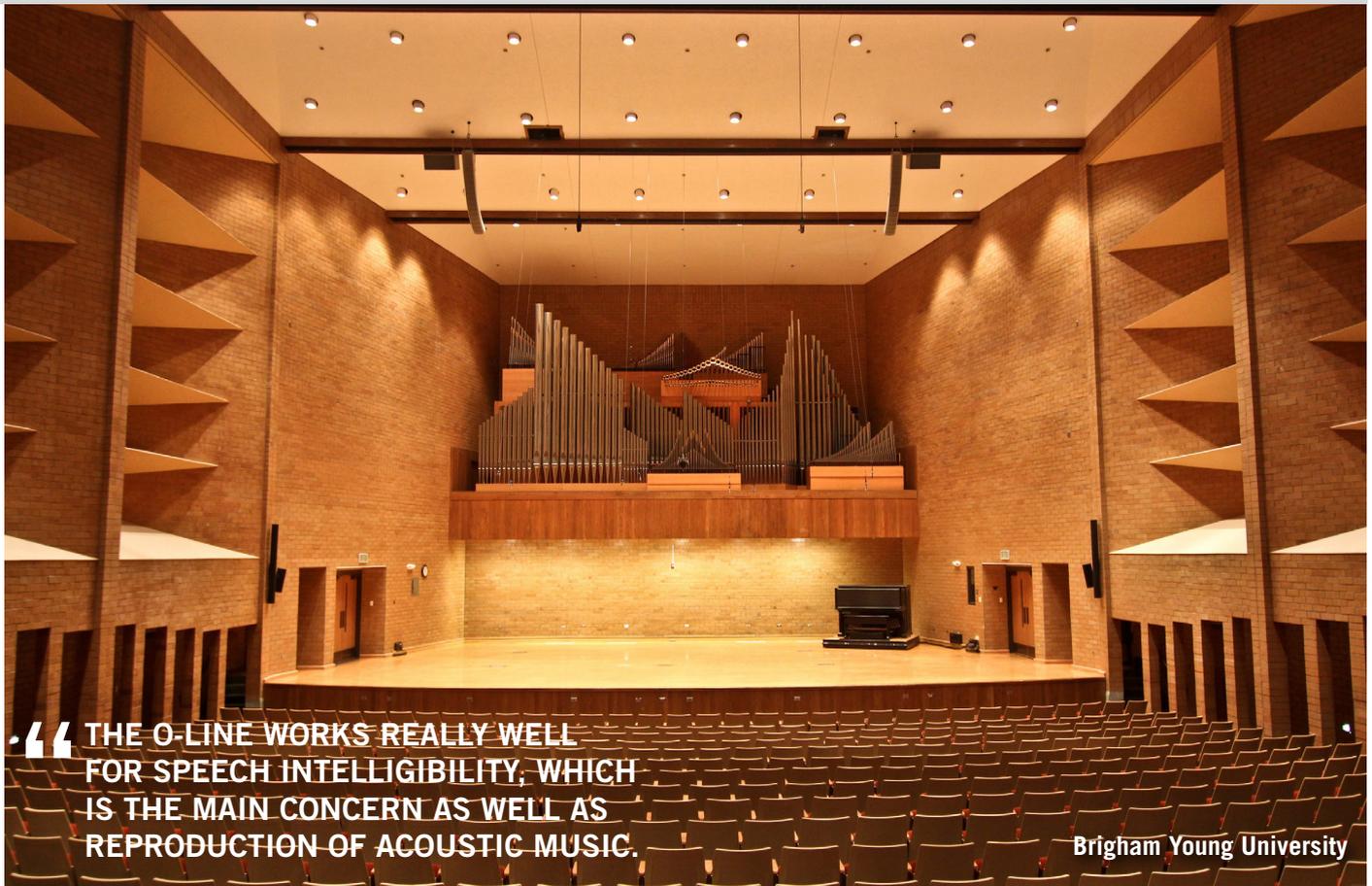
All of which is a source of great satisfaction for Tessa Rogowski. “It is exactly what I was hoping for,” she said, “... clear vocal reproduction even at the back of the hall in the seats positioned immediately in front of a significantly noisy HVAC outlet ... and there is no feedback.

“From those with experience of the previously appalling sound, this time when they entered the room, and we turned on the volume, they universally walked round the hall with silly grins on their faces. Sad though this is, we don’t get compliments, we have just stopped getting complaints — and trust me this makes it more than worthwhile.

“As for the installation process, I was most impressed. We could only give [the installation team] the smallest time frame to undertake the work — as the hall is booked at least six months in advance — and despite this all the work was completed on time.”

But the final word comes from Sam Simon-Norris. “This is just the sort of application for which O-Line was designed and feedback from the university staff suggests that it has met and exceeded the initial brief on all counts.”

Brigham Young University, Idaho



“**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



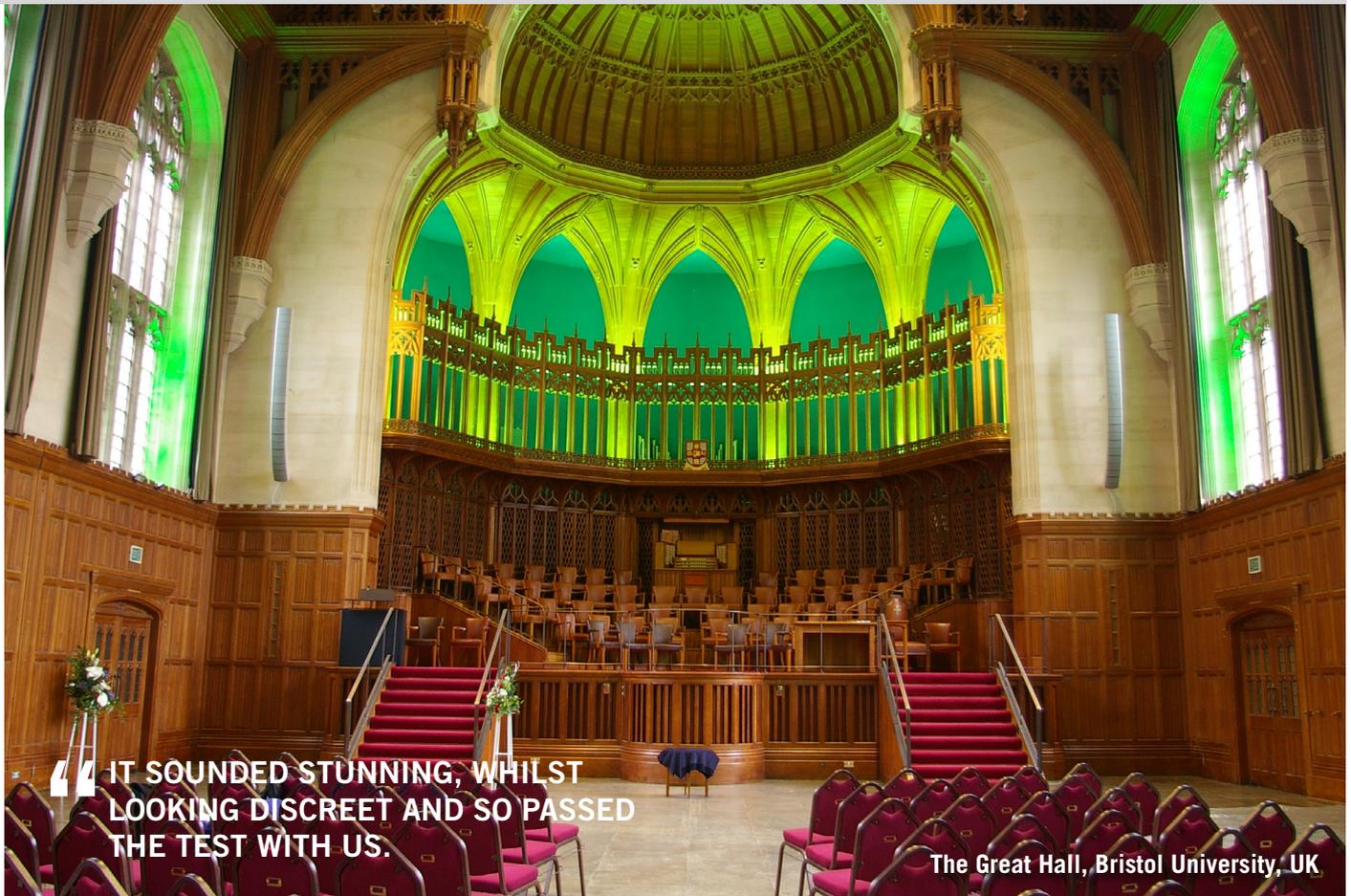
850. Two discrete eight-module O-Line hangs on either side of the rostrum cover the chapel along with two AQ210 subs under the stage.

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.”



The Great Hall, Bristol University, UK



**IT SOUNDED STUNNING, WHILST
LOOKING DISCREET AND SO PASSED
THE TEST WITH US.**

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.

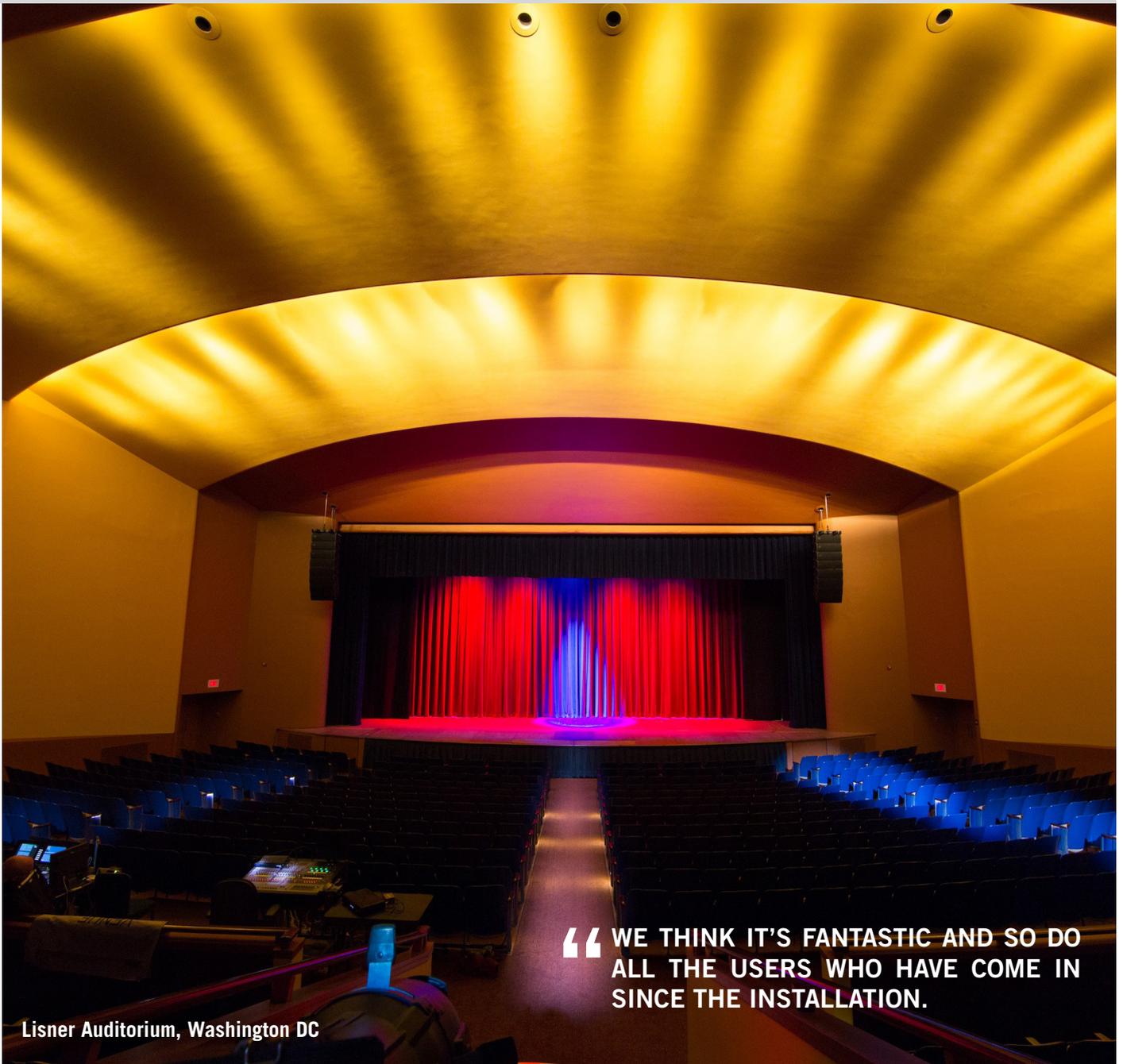
“What we were looking for was clarity, evenness of coverage and directivity because it's all teaching space around here and so containment was important; there were also the aesthetic concerns. We just fed the system with a CD and radio mics — it sounded stunning, whilst looking discreet and so passed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

Lisner Auditorium, Washington DC



“ WE THINK IT’S FANTASTIC AND SO DO ALL THE USERS WHO HAVE COME IN SINCE THE INSTALLATION.”

Lisner Auditorium, Washington DC

A fixture in Washington DC live entertainment since the Second World War, George Washington University’s Lisner Auditorium has hosted an eclectic mix of performers from Ingrid Bergman to Pink Floyd, along with leading world music artists, local opera and symphony companies and celebrated political dignitaries over the years.

But without a significant upgrade for many years, the university recently decided to overhaul the venerable auditorium with special emphasis on the sound systems in a bid to make the venue more competitive in terms of attracting high-profile talent. Selecting Martin Audio’s new MLA Compact system was a natural choice because its technology is definitely state-of-the-art.

The 1500-seat venue was the perfect size for the system, with eight MLA Compacts per side with a centre array of six DSX subs under the stage.

Since the upgrade, Lisner has presented a series of popular and well-attended world music concerts by artists such as the Brazilian singer-songwriter Gilberto Gil and Acoustic Africa, as well as the sold-out debate between Fox’s Bill O’Reilly and the Daily Show’s Jon Stewart.

Eric Annis, Production Manager and Technical Director for Lisner, was enthusiastic about the new MLA Compact, “We think it’s fantastic and so do all the users who have come in since the installation. We’ve had several televised events in a row and maintaining the sightlines within the auditorium is wonderful. The shows have run the gamut from loud electrical music to a single mic bluegrass band, and the MLA Compact system has proved to be equally articulate and clear.”

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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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