CASE STUDIES

Houses of Worship

Unite Your Audience

The Martin Audio Experience

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Martin Audio

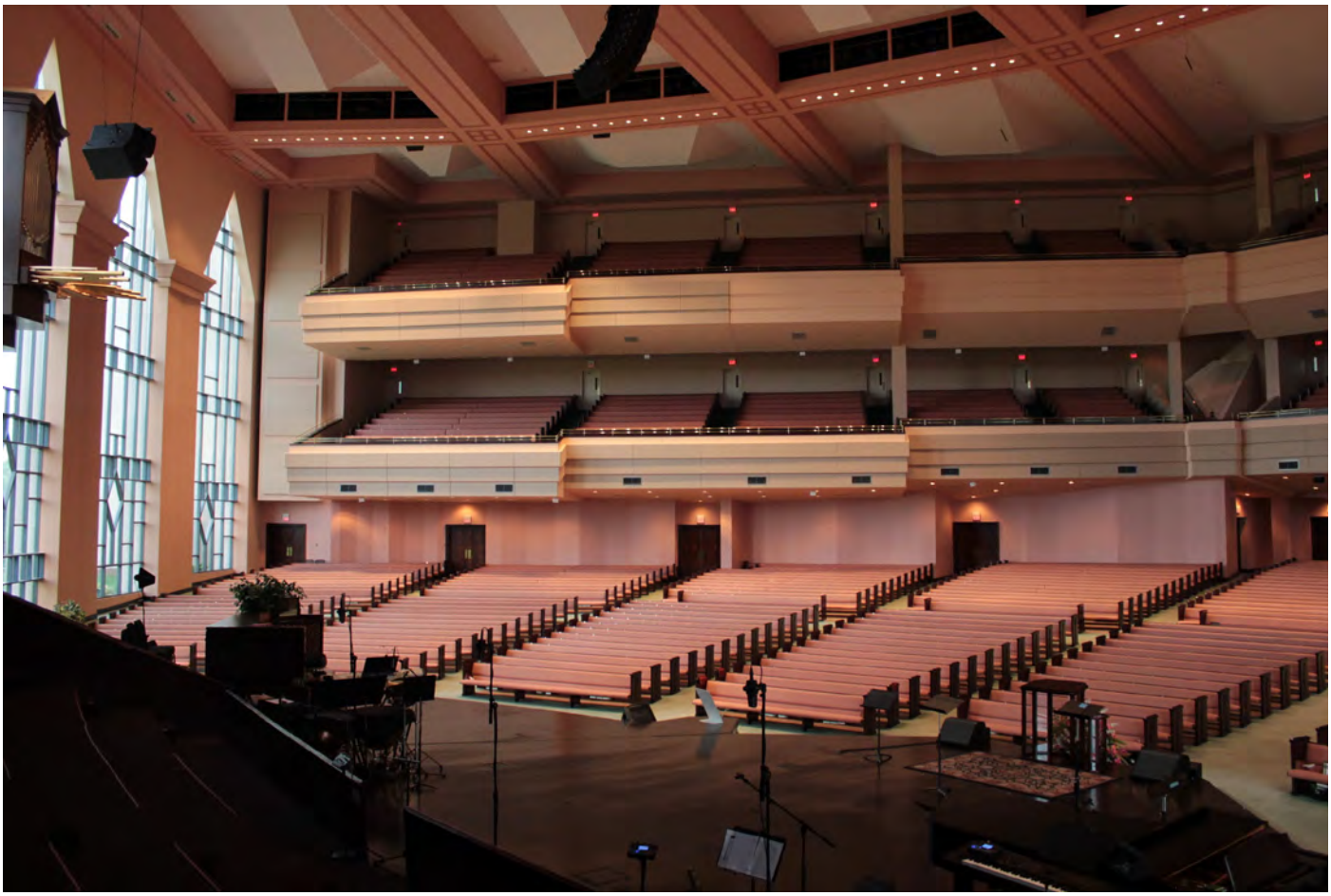
At Martin Audio we believe that uniting audiences with exciting sound creates shared memories that sear into the consciousness delivering more successful tours, events and repeatedly packed venues.

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.

Houses of Worship – Uniting the Congregation

At Martin Audio we recognise the importance of intelligible speech and music that envelops the audience, front to back, regardless of the challenges of highly reverberant spaces that many houses of worship tend to occupy. Equally, with everything from traditional services to Gospel to full on rock performances, we offer a range of solutions to meet the diverse needs of this sector.



MLA System Solves Problems at Calvary Church

Clark, a full service design, engineering and integration firm specializing in Houses of Worship, recently deployed a Martin Audio sound system based on MLA arrays as part of an audio upgrade to solve late reflection problems on stage and ensure consistent coverage in the huge 5,000-seat sanctuary of the Calvary Church in Charlotte, North Carolina.

Calvary Church is known for having one of the largest pipe organs in the world valued at approximately $3.7 million with 205 ranks and 11,499 pipes, which presented a significant challenge for the integrators in terms of providing reinforced sound that wouldn’t have a negative impact on the organ and the room’s natural acoustics.

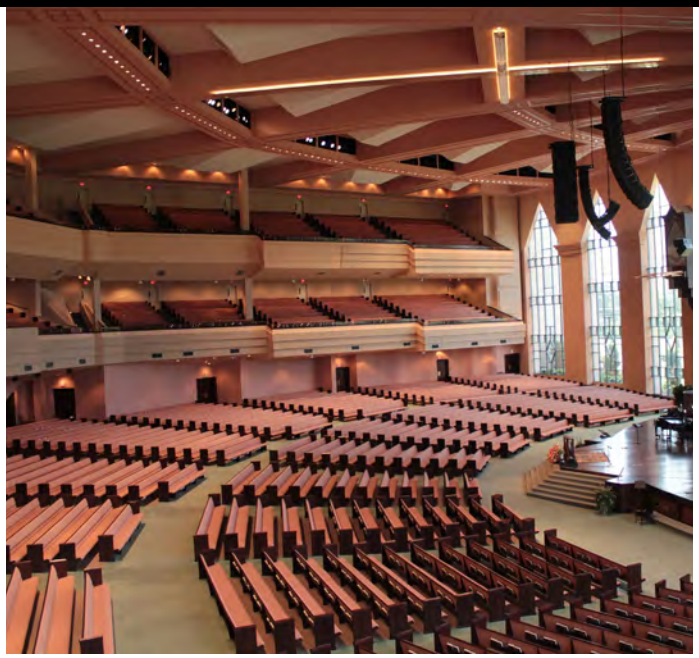
Houston Clark, principal and co-founder, describes the problem his team had to solve: “It’s a newer building that embraces both traditional and blended worship—regularly using its massive pipe organ. So the challenge was very unique in two ways: the church wanted reinforced sound in the room for speech, a choir, orchestral and modern instrumental music without negatively impacting the acoustics for the pipe organ.

“We needed to calm the room down acoustically when we energized it with reinforced sound without treating it acoustically,” Clark continues. “We also needed to eliminate reflections off the back wall that were causing intelligibility problems for the Pastor and choir, so we came up with a unique solution using the Martin Audio MLA system that would solve those problems and ensure consistent coverage for every seat in the congregation.”

The system Clark devised for Calvary starts with three hangs from the center of the ceiling with 16 MLA enclosures on the left and right side and 6 MLX subwoofers in the center. An array of 8 MLA Mini facing the choir and orchestra pit is hung behind the subwoofers to provide effective monitoring for the stage.

Additionally, two flown Martin Audio H3H+ speakers per side are used for outfills and 2 XD12 speakers in the greenery at the edges of the stage are used as planter fills for the outermost sections of the seating. Under balcony fills to cover a small section of the congregation at the back of the hall are provided by 6 Martin Audio DD6s and upper balcony fills by 4 XD15 speakers.

“What’s unusual about Calvary is the fact that they blend traditional choir, organ and orchestral music with a modern electric band in one service,” adds Houston. “So we had to make sure the PA was effectively reproducing all of those elements without over-energizing the hall. MLA allows us to do that and control the slap-back echo off the back wall of the room that was negatively affecting the Pastor’s sermons. With the previous system, he had to meter the tempo of his sermon because his voice was



coming back at him and creating intelligibility problems. With the MLA, we could use the hard avoid feature and eliminate those reflections for the Pastor and the choir.

"The other thing that really works now is going from the main floor, to the second and third floor balconies, the sound experience is consistent at every floor," Houston concludes. "You have a dream when putting together this type of PA that every seat will have the same audio experience and it was truly amazing to walk all of those floors and not perceive a difference in the sound."

Calvary's Technical Director Dan Smith is also impressed with the MLA system: "It's been working great, we're really pleased. We don't have to worry about all the reflections and mix around them anymore, we can get a fuller, truer mix out there. A typical Sunday service includes the choir, full bands with drums, keyboards, electric bass, and a brass orchestra with percussion. I usually run between 60 and 65 inputs, so it's a pretty big production. I can get all the elements to come out where it was really difficult before.

"The best part of using MLA is that we can do all of this without affecting the organ and the room. That's one of the main things we looked at from the get-go when we were looking at different speaker systems because we didn't want to pad or treat the room because it's such a great sounding room. And the control is amazing now. I was sitting on stage last night and you can't even detect the slap-back of a snare off the back wall. It's like being in a big room with no back wall."

Discussing the system's ability to eliminate typical problems, installation team leader George Clark adds, "Normally in a lot of these larger spaces, you spend just as much time evaluating the impact of the PA in terms of what's happening on stage as the auditorium. That's 50% of the battle, you may have covered the room well but if you've destroyed intelligibility on stage, what have you gained? The main thing for me about MLA is we could take care of people on stage and those in the audience."

Gwinnett Church Enhances Worship with MLA Compact

One of six North Point Ministries churches in the Atlanta area, Gwinnett Church recently completed construction and outfitting for a new worship center on its campus.

The center's main sanctuary, named the Theater, is a rectangular 1300-seat auditorium that features the latest audio, video and lighting technology to provide a completely absorbing worship experience. Installed by Clark of Atlanta, Dallas, Austin and Los Angeles, a key component of this technology is a Martin Audio MLA Compact loudspeaker system that provides uniform coverage for every member of the congregation inside while controlling noise overspill outside the building, which is located a few hundred feet from a residential neighborhood.

Asked to describe a typical Sunday service, Gwinnett Technical Director Adrian Varner says, "We usually start with an announcement video about the service and upcoming events, not all communications from the stage are verbal. Sometimes we'll have a music video as a fun attention grabber, before moving into one of three songs and a transition before the sermon.

“Because we are a North Point Ministries Church, we’ll have lead pastor Andy Stanley speak to us on video via fiber. He generally speaks 40 to 42 Sundays a year with Gwinnett pastor Jeff Henderson speaking to the audience live on other Sundays.”

A five piece electric band (two guitars, bass, keyboards, drums) with two to four worship leaders who also handle vocals provides “rock and roll style” music for the contemporary praise worship services. The audio, video and lighting systems are intended “to break down the wall between the stage and audience and bring that stage experience directly out into the audience,” according to Varner.

“With the style of worship that we’re doing, I’m trying to have an experience that really surrounds you. It doesn’t just feel like it’s coming at you from the stage, but you feel really absorbed in it as it happens all around you.”

A big part of this experience depends on the sound, which explains the choice of a Martin Audio MLA Compact system with eight enclosures a side, four DD12 for outfills and eight DD6s for front fill.

“We have a DD12 outside of each hang for front of congregation and one DD12 a side for the back of the hall,” Adrian adds. “The eight DD6s are mounted on the subs under the stage.

“Our room is 150 ft. wide by 75 ft. deep and, as a rectangle, it can be hard to provide uniform coverage to the far extremes. We’ve been able to achieve that coverage extremely well. The system has exceptional clarity for speech and we needed a system for music reproduction that could comfortably hit 100dB (A-weighted) or greater with enough headroom, which MLA does easily.

“We also wanted to provide smooth, even coverage from front to back, not just in terms of volume, but consistent tone for every seat in the room. I don’t want anyone to feel it’s too bright where they’re sitting, because it’s not fair to have people seek out certain seats in the audience so they can have a consistent tone experience. We don’t have that problem with MLA.

“Also, the volume is loud enough where people can sing comfortably and not be afraid that the person in front, behind or alongside will hear them, so they can be more engaged in the singing without worrying that they don’t have pitch-perfect voices.

“I absolutely love the MLA Compact system, Adrian enthuses. “I mix Front of House and have found it to be the most enjoyable system I’ve ever mixed on. One of the things I continue to hear from people who come up to us, both professionals and audience members, is how smooth and clear the system is. How clear the top end is but it doesn’t hurt, there’s no harshness to it, which for me is a big selling point for this system.”

The audio system also includes DiGiCo SD10 consoles for FOH and Monitors, a Neve 5045 Portico Source Enhancer and a selection of Shure, Sennheiser, Royer and Radial wireless and wired microphones.

Gwinnett's sophisticated video system is based on Digital Projection Titan projectors for side and center, with Panasonic AK-HC931 and HPX-10 cameras; a Ross Carbonite 2ME production switcher; Harris 96x96 router; Clear-Com Matrix for communications; Harmonic message playback, and a Renewed Vision Pro Video Server and Pro Presenter.

The lighting system includes a Jands Vista L5 console; Arkoas MediaMaster media server; ETC Source Four (zoom, ellipsoidal, and parnels) and ETC Sensor 3 for key lighting; Martin MAC Aura and MAC Viper lights; Chauvet Tri Tour and Epix Strip 2.0 LED lights; a Pathport Octo for distribution, and a ChromaQ Inspire 2 for house lighting.

In addition to providing consistent coverage for every congregant, the MLA system also solves a critical noise overspill problem for the church. There is a residential subdivision located a mere 300 feet behind the back wall of the auditorium and building.

Knowing this would present a problem given the high decibel audio for early morning sound checks and services, the church specified walls with three inches of concrete, two inches of Styrofoam, and three inches of concrete, with four inches of lightweight poured concrete on the roof. Although this "does a good job of keeping the sound inside, some still leaks out a bit, especially during soundcheck at 6am on Sunday when it's pretty quiet outside," according to Adrian.

"Because of MLA's amazing control, we're not only covering the seated section very well, but also actively keeping sound off of the roof and the back wall. And with a situation like ours where we don't have 18 boxes a side, it's tough to get that control over those low mid frequencies, but MLA has really been a huge help. Ever since we've been up and running, we haven't gotten any noise complaints from the neighbors. And with all of those electric instruments and vocals, things have been pretty lively on stage, so the kind of control we get from MLA has been a big help."

Houston Clark, company co-founder and principal of the installation company that recommended MLA, echoes those sentiments when discussing the project: "Clark has partnered with North Point Community Church for over 15 years. During that time, we've built a significant amount of trust. We were asked to help them solve a unique problem with their new Gwinnett campus. We had to develop an audio solution that met their very high sonic requirements that would also minimize sound 'bleed' into a nearby housing subdivision. After researching the design parameters, we knew Martin Audio could give us the results we were looking for. The MLA speaker line was a perfect fit. We could literally steer the sound away from the areas we wanted to avoid without in any way degrading the sonic experience."

Summing up the Church's reaction to the MLA Compact system, Adrian concludes, "Everyone that's heard MLA has been incredibly pleased with it. Our music director brings in music directors from other campuses, and he'll always ask me to turn on the sound system and show them what it can do."

Gwinnett Church, Los Angeles

Roswell Church Retains Natural Acoustics with MLA

Roswell United Methodist Church, USA

Roswell, GA—The Roswell United Methodist Church recently upgraded their sound capabilities with a Martin Audio MLA Mini system that provides precise sonic control while embracing the worship sanctuary's natural acoustic properties.

Houston Clark, principal and co-founder of Clark, the design and integration firm responsible for the installation, describes Roswell as "a very traditional church with a uniquely shaped worship space that has a high domed ceiling with exposed beams and excellent natural acoustics.

"That said," Houston continues,"it was challenging to get a positive PA experience in such a beautiful room because we didn't want to use a lot of acoustical treatment which would have adversely affected its visual aesthetics and natural acoustic properties.

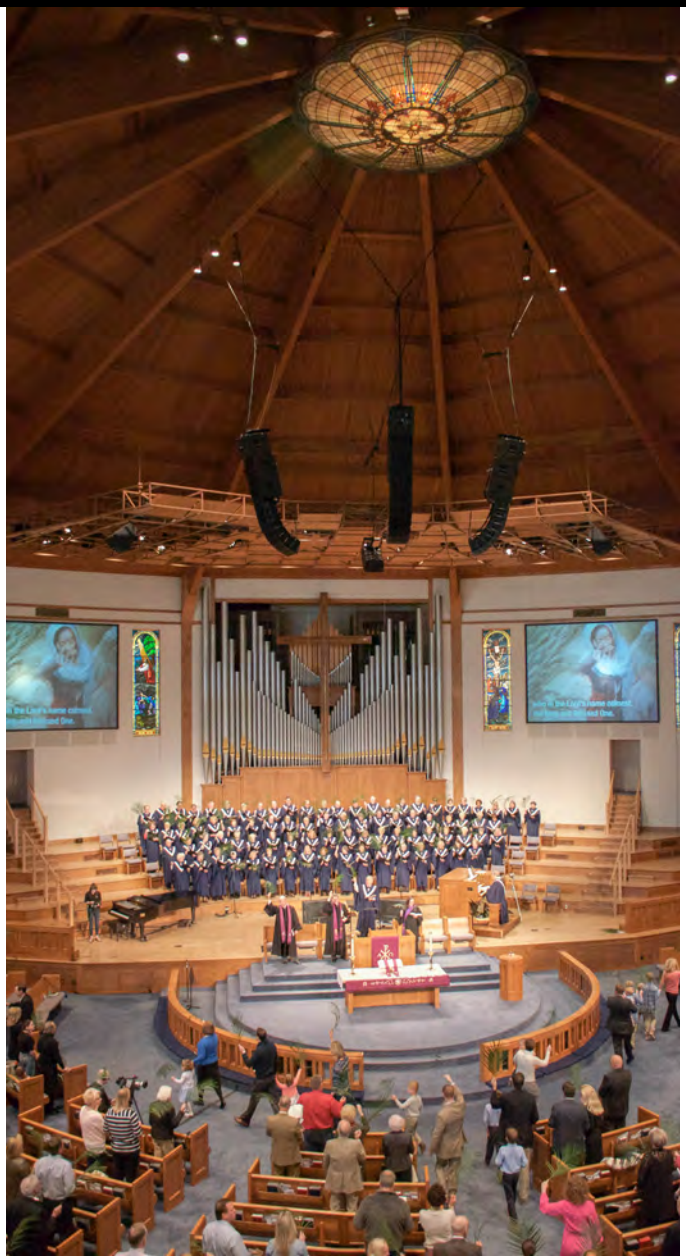
"We were able to work closely with the church and demo the Martin Audio MLA Mini to show them the system's unique properties and how it could solve their problems. As it turned out, they were comfortable going forward with us knowing it wouldn't be a traditional approach to solving that room's PA and acoustical issues."

The system Clark came up with consists of three hangs of 8 MLA Mini enclosures with 3 MLX subs flown from the ceiling in a cardioid pattern. A MLA Mini enclosure array with four enclosures is deployed for choir monitoring. Two Yamaha CL5 consoles are used for FOH and web broadcasts.

"We wanted a PA that would make the room sound good without relying on electronics," Houston adds. "When you use a Martin Audio speaker system, it represents a higher order of PAs among the best in the world. It's not just that the sound is controllable—you can direct it away from certain surfaces and put it where you want it—the PA just sounds great.

"Churches like Roswell that want to embrace natural acoustics when it's appropriate for their worship style and programming, don't have to make the kind of trade-offs they're used to with other systems, when deploying MLA. This is one of those instances where you come really close to having your cake and eating it too. It offers dual functionality as an amplified PA with natural sound in the same room, something that hasn't been available until recently.

"Over the years, we've developed a reputation for fantastic sounding PAs," Houston continues, "and even though Roswell UMC isn't a rock and roll worship service type venue, the quality of the sonic signature had to be on par with all of the systems we provide. The church has a choir and a band and orchestra for traditional and more contemporary services. MLA takes advantage of both reinforced sound when you need it and natural acoustics when that's required. This is our fourth church install with MLA and it's proved to be a truly amazing product for very different types of sanctuaries.



"Calvary Church (Charlotte, NC) is a 5,000 seat room with two balconies and MLA has proved to be just as applicable in a large space like that. Or there's a large asymmetrical room in the Sun Valley Community Church (Gilbert, AZ) that's almost exclusively for rock and roll-based contemporary services, and a very modern space from the ground up at North Point Ministries' Gwinnett Church (Atlanta, GA) where you're trying to get consistent coverage from front to back and also avoid leakage to the neighborhood. Like all of those churches, Roswell is absolutely happy with the Martin Audio MLA solution for their worship sanctuary."

Aaron Freeman, AV Assistant at Roswell, echoes Houston's feelings about MLA. "The worship space seats around 2,000 and it can be challenging to get the coverage you need with the high domed ceiling and stained glass windows at the top.

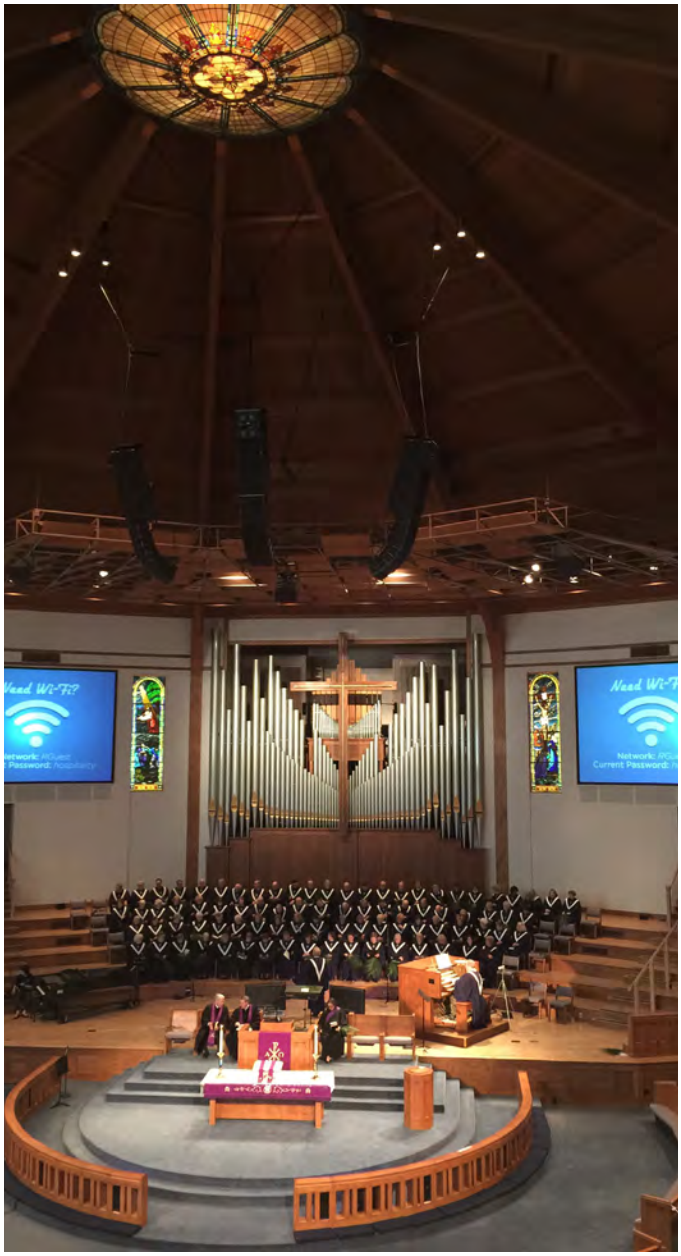
"The new MLA system sounds fantastic, worlds apart from ", Aaron points out. "One of the biggest 'wins' is that our congregants aren't using as many hearing-assist systems.

The MLA system has exceptional intelligibility. Our older congregation has been able to hear the sermon for the first time in 25 years, which might sound like an exaggeration, but is actually pretty accurate.

"We have two services, one more contemporary with electric guitar, bass and V-drums and MLA sounds great for that. For the second service, which is more traditional, the system's allowed us to get more of the choir out of the speakers where it doesn't sound reproduced electronically, but naturally amplified the way it's supposed to be.

"And the control is remarkable," Aaron sums up. "For example, you can hardly hear the Mini 4-speaker array aimed at the choir loft in the rest of the house because there are no reflections off the organ wall coming back out to the crowd.

Overall, there has been nothing but positive comments about the system. The mantra for this new installation was, 'it has to be right.' And Clark and MLA have done just that."



River City Christian Upgrades with New WPS Rig

River City Christian Church, California, USA

A new technical infrastructure, including a premium Martin Audio WPS PA, has been installed at the River City Christian church in Rancho Cordova, California.

The full integration was undertaken by Sacramento Production Services (SACPS), whose Project Manager, Keith Wackford co-designed the system with the church's Director of Technology, Brian Webber. Both men are long-term colleagues who have over a ten-year history working with Martin Audio systems.

The church had been faced with the need to expand its facilities due to surge in attendance prior to COVID-19. An architect was brought in and the decision taken to move from all flat seating to stadium style arena seating. By also reducing the stage thrust this would expand capacity from 850 to around 1200. "In addition, the previous control booth was up on the balcony but the new one has been relocated to the audience area, so we can hear exactly what the audience is experiencing," stated Webber.

> **"CONSISTENCY IS ONE OF THE MOST IMPRESSIVE PARTS OF THIS INSTALLATION; FROM FRONT TO BACK AND LEFT TO RIGHT THE COVERAGE AT EVERY SEAT IS AMAZING.**

Tasked with replacing the systems, Brian Webber approached Keith Wackford and WPS was chosen following a demo "which blew me away", said the former.

But the decision had not been straightforward as they first reviewed two other globally recognised brands; but the Church's technical director always had his eye on WPS.

"When SACPS first bought a WPM system a few years ago and it was obvious the tech behind it was next generation," Webber observed. "But then we got WPS on demo and put that next to the WPM, and I knew I had to have it. I was super impressed with the smooth, rich sound. It was a no-brainer."

He recognised it would be a challenge to work within the room's acoustics. "But it's great to have the audio only where it needed to be and not where you don't. You really can't hear anything behind the PA, no slapback, and all the energy is focused to the seating areas. We loaded the DISPLAY export file into the iKON amps and other than notching out a couple of frequencies, we basically ran the system straight out of the box."

The design features eight elements a side, in two PA hangs spread 12m apart—trimmed to avoid obstructing sightlines to the new LED video display.

Five Martin Audio SXC118 subwoofers have been placed in an arc across the front, powered by six channels of process-controlled Martin Audio iKON iK42 amplifiers, and optimised using Martin Audio's proprietary sub array calculator as well as EASE prediction software. They were chosen for both their size and their ability to utilise a cardioid pattern to send more of the bass to the listening areas and have a high rejection to the rear of the speaker, thus eliminating low frequency information onto the stage.

Martin Audio CDD (Coaxial Differential Dispersion) series has been selected for fill duties. "The two CDD115's cover the extreme sides as it's a super wide building," continued Webber, adding that a further four CDD6 take care of frontfills. All the main PA hangs and CDDs are run from iK81 8-channel amplifiers and iK81's power the main PA hang, in 1-box resolution.

Finally, River City Christian also utilises Martin Audio in its children's room where CDD12's and CCD8's have also been installed.

Martin Audio's proprietary DISPLAY software modelled the room, with optimisations carried out by Keith Wackford. "We worked with [Martin Audio's] Joe Lima on to get a design concept going—based on EASE data—and input the numbers into DISPLAY.

"Joe went through the DISPLAY file while final system tuning was occurring and was able to make a few final tweaks to the file, reducing the dB offset from first seat to last. We achieved total feedback rejection, despite the

PA being quite a bit upstage thanks to the Hard Avoid® functions of Wavefront Precision. You couldn't have got away with any other rig."

This was complemented by further onsite tweaks and calculations to the design as the system went in—the measurements reconfirmed by Martin Audio's Will Harris, along with Keith Wackford. A laser measurement was also undertaken at installation stage to verify that the field drawings matched those within DISPLAY. All of this ensured that the system would meet or exceed client expectations.

WPS also had to display its versatility as it is tasked with reinforcing two styles of service: a classic worship, with choir and orchestra, with pastor and celebrants on radio mics, and a more modern, high energy service, featuring a five-piece worship band.

Finally, the installation is also neat and aesthetically pleasing as the installation team has managed to avoid using obtrusive rigging. "Guide ropes would have been completely detrimental to the look. In fact the CDD6's almost looks like they are floating on the downstage edge," says Wackford.

Summing up, he says, "Consistency is one of the most impressive parts of this installation; from front to back and left to right the coverage at every seat is amazing. People we have brought in to hear the new sound system have all commented on its consistency. Furthermore, there's nothing harsh about the sound—it's easy to listen to for hours, it's just so smooth and you don't get fatigued. The system simply tailors the speaker presets to the room via the DISPLAY file."

This is echoed by Brian Webber. "The ability to custom build a system and tailor it to your building without having to boost anything is scarcely believable," he concludes.

Having previously rented a sound system solely for outdoor use during the pandemic, the church is relieved to have moved back indoors once again—with the necessary precautions in place—while congregants still have the opportunity to log in and attend virtually if they prefer.

Photography: Marisa Morton

World's First Installation of Wavefront Precision at First Pentecostal


First Pentecostal Church, USA

The recent audio upgrade by Clark at the First Pentecostal Church in North Little Rock, Arkansas featured the world's first installation of both Martin Audio's new Wavefront Precision Compact and Mini optimized arrays with iKON® amps along with CSX218 subs and the new LE100 monitors.

As described by Clark Project Manager Brandon Byrd, 'the Church had to replace an old, worn-out PA that didn't cover the room or provide the audio quality and clarity they needed. Martin Audio had just come out with the new WPC system and it was a perfect choice for this installation because it offered great Martin Audio sonic performance and optimized coverage and control for the price.

'The actual system includes 16 WPC a side for the main array with a side fill array of six WPM a side covering the extreme outside corners because they can really pack people into this place, especially for special events. The stage was modified to accommodate the five CSX218 subs per side that are recessed into the front with everything powered by the iKON amps. All the hangs are covered with white acoustical fabric to be more visually integrated.'

First Pentecostal's sanctuary is an acoustically challenging space with large domed ceilings, a balcony, stained glass windows and hard marble surfaces. 'They didn't want to add acoustical treatments,' says Brandon, 'but with the WPC system you can get additional resolution and coverage

> **"THE OVERALL REACTION TO THE SYSTEM HAS BEEN OVERWHELMINGLY POSITIVE.**

by adding more boxes with a channel dedicated to a single amp. We went for the highest resolution which allowed the system to create interference that significantly reduces the audio level hitting the hard surfaces we wanted to avoid. That, plus the coverage is consistent throughout the space.'

Asked about the system, First Pentecostal Technical Manager Nick McKinnon explains, 'We were looking for speech intelligibility first and foremost. Conveying the message whether it was song or speech is our absolute priority. Keeping the vocals over the music and the preacher's sermon clear and present in what is a very reverberant space is critically important for us.

'So, the optimization capability of Martin Audio WPC was very attractive on paper and if it did what it said it was going to do that was the choice we had to make. Getting the sound off where it didn't need to be and focused on the audience where it belonged was crucial for us, and it did exactly that.

'I can tell you how we know it works. At our 35th annual Camp Meeting there were 4500 people in our 2800-seat

sanctuary and a lot of crowd volume. In our balcony, the Hard Avoid area starts at the top of the mezzanine and there's a walkway before the coverage starts at the seating area about six feet above the actual balcony rail. An usher who was in the walkway commented that it just didn't sound that clear where he was standing. So, I asked him to walk up into the seating area of the balcony and he came back a few minutes to tell us the sound was perfect up there.'

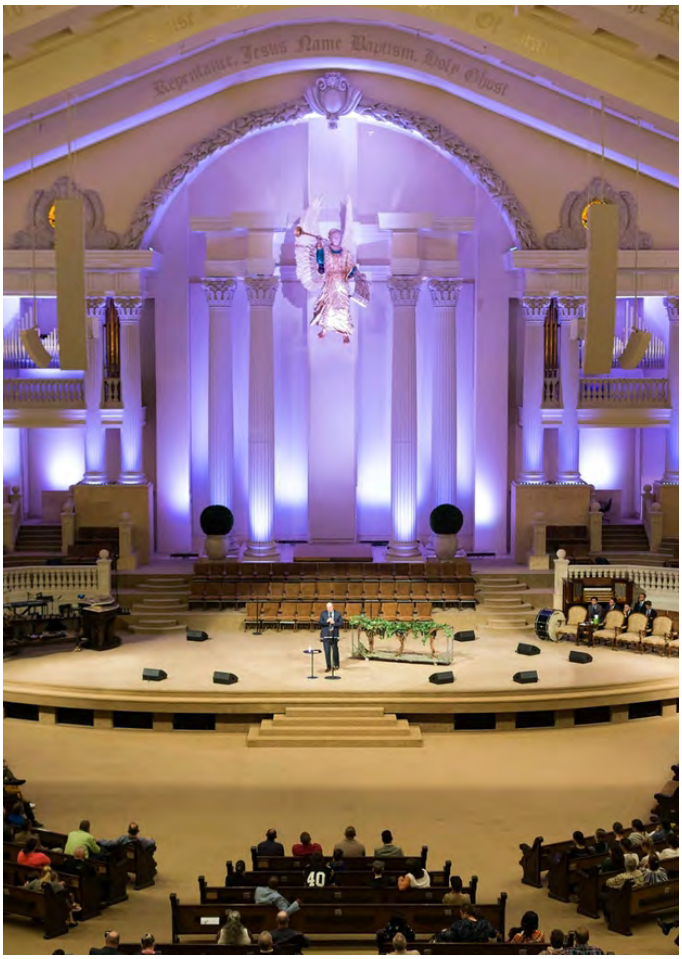
According to Nick, 'the Church has two services on Sunday and one on Tuesday night with electric bands--we pretty much go full out for all three services. There's a smaller chorale on Sunday mornings and a 100-voice choir on Sunday nights with more of a gospel feel.

'When it comes to music reproduction, WPC is like sitting in front of a great set of studio monitors. We have a Midas Pro X console and we've gone from making 9dB changes in the EQ to 2 and 3 dB changes and really noticing the difference. The changes are very audible-we're even hearing the compressors now if there's too much reduction.

'The coverage is truly exceptional. We have seating in alcoves and they were just getting reflected sound before. Now with the WPMs on the side, every seat in the house has even coverage, top to bottom, side to side.

'We've also solved problems onstage with the new LE100 monitors. They combine compact, low-profile enclosures that give us expanded individual coverage for performers and speakers and they sound really good.

'In terms of the subs, we brought the Pastor in to hear some symphonic music and he mentioned that when you close your eyes, it's more of an experience than just listening when you can hear the full spectrum of sound. And the overall reaction to the system has been overwhelmingly positive. The only thing the staff asked is why we didn't do it sooner.'



Martin Audio O-Line Receives The Royal Treatment

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.

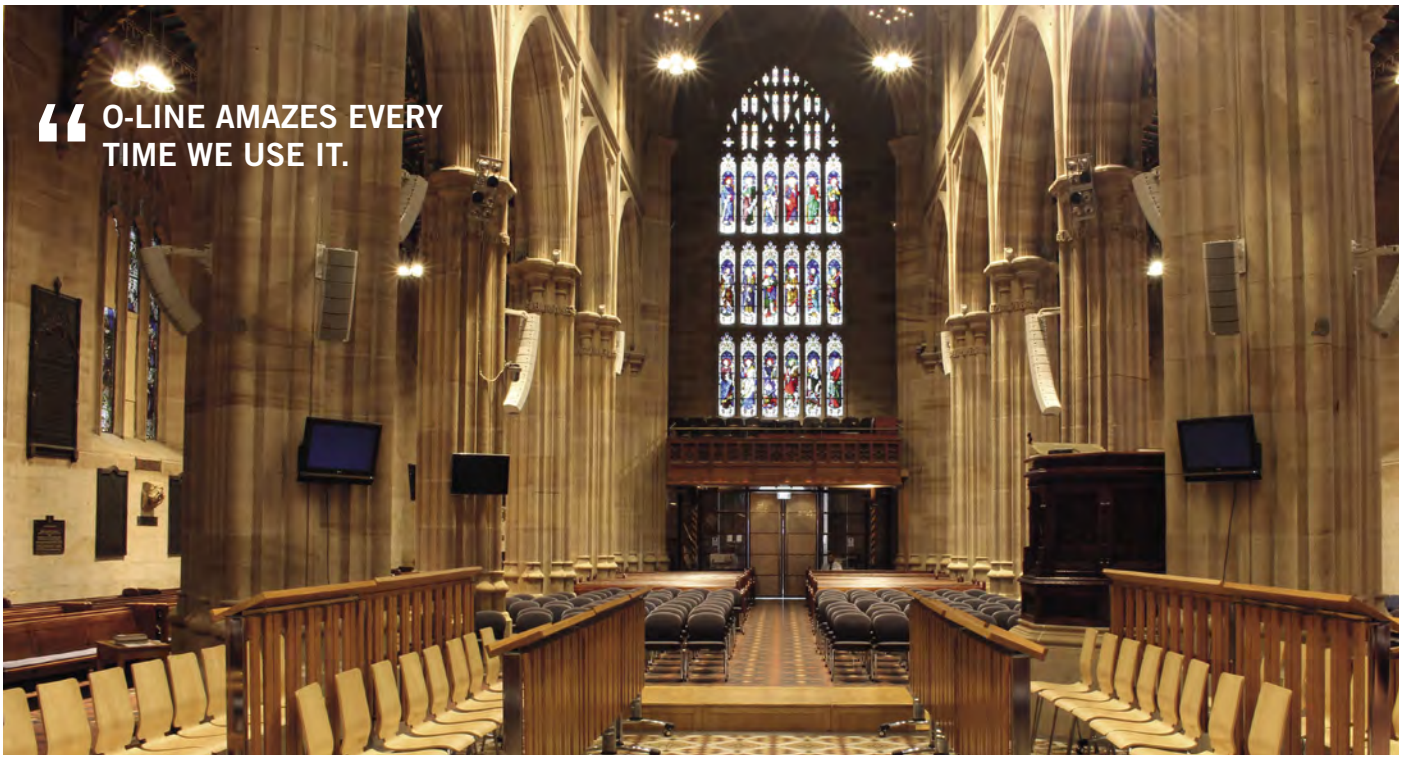
Wizard's design solution was to deploy an unprecedented 140 O-Line elements (distributed over 22 hangs) along with six Martin Audio AQ212 dual 12 inch sub bass. Not only was the quantity of elements enormous but so was the DSP control.

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



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."

Grace Church Upgrades with Martin Audio TORUS

Grace Church, Iowa, USA.

Based in Des Moines, Iowa, Conference Technologies Inc (CTI) recently completed a sound system integration at the nearby Grace Church—replacing the former PA, which had serviced their requirements for two decades, with the constant curvature technology of Martin Audio's TORUS array.

This is the latest of a progressive series of AVL upgrades at the church undertaken by CTI over the past 10 years, and meets the high demands of a Southern Baptist church, whose lively worship ministry is based around bands, choirs and orchestras.

Led and overseen by worship pastor, Michael Hoskinson, the old PA, which had been in situ since the church opened, was providing inconsistent coverage across the 1200-seat fan-shaped auditorium and was clearly ready to be retired. "What we were looking for instead was a line array that would provide even coverage everywhere," said the pastor. The previous system's subs were also set upfront on the ground, and had been visually obtrusive. "And so we were looking for a system that would enable the subs to be flown, and at the same time provide better coverage."

CTI's VP Systems Integration, Tim Wright, who masterminded the integration, took over. "The frequency response from front to back and side to side was not good, and it had never been tuned to the room. As technology has advanced, and our needs have become more critical with regard to frequency response, so our expectations have changed."

> **"SONICALLY I HAVE ALWAYS BEEN IMPRESSED WITH THE VOCAL QUALITY OF MARTIN AUDIO AND TORUS**

He made a wish list and discussed his requirements with Martin Audio North America. "We had a couple of runs with their design engineers and felt the coverage maps could still be improved. Then expectations leaned towards TORUS, and I knew that solution was spot on. I had heard the system at a trade show and knew exactly what it was capable of.

"Sonically I have always been impressed with the vocal quality of Martin Audio and TORUS is a level beyond that. I tested it with a CD and the clarity was fantastic; for the price point Martin Audio hits, this is second to none."

Michael Hoskinson agrees. "From the other integrator options I was given we could have spent double the

money for the same result." In fact Wright himself had presented four different options, meeting different price points. "When I was asked which one I would recommend it was a no brainer," he said. And having seen some sample videos of TORUS online Michael Hoskinson wasted no time in rubber stamping the decision.

So what makes TORUS so ideal for a flared space such as this? The constant curvature array is designed for applications that typically require an optimum throw between 15-30 metres, and where a full-blown line array or point source solution may not be appropriate. The T1230 offers a vertical pattern of 30° while T1215 offers 15° but both then have a flexible horizontal pattern that can be manually adjusted between 90°, 60° or 75° (asymmetrically)."

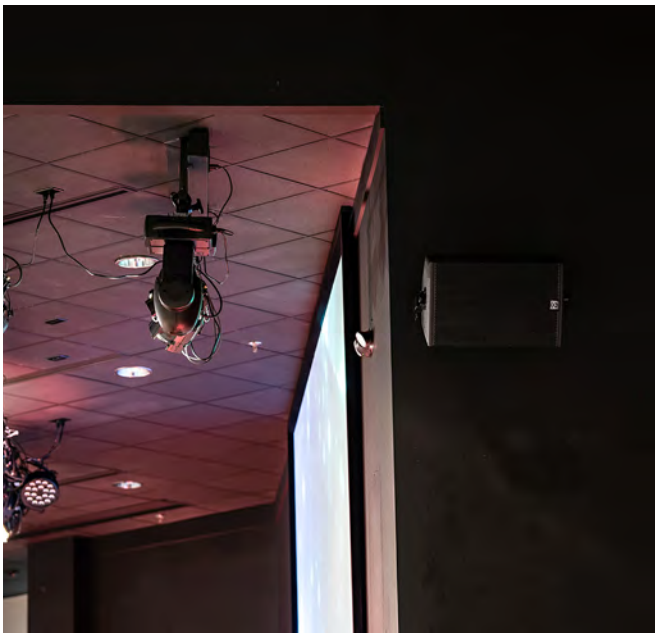
Although Tim Wright has long been a fan of Martin Audio, he admits that CTI have only become recent converts to Martin Audio. "Although I have installed the brand previously this was the first big chance to do something of this calibre and size."

However, the Grace Church fit-out was not without its installation challenges included locating the three hang points, with a confined workspace above a hard-deck ceiling. But an L/C/R system was duly implemented, with a combination of two TORUS T1215 with a T1230 underneath, backed by a pair of SXCF118 18in cardioid subs, on each hang, driven by four iKON iK42 4 x 2500W Dante-supporting process-controlled amplifiers. A further pair of Martin Audio's high-powered XD12 12in point source speakers were deployed as corner fills and seven of the ultra-compact DD6 6.5in speakers placed around the perimeter of the stage for close front fills. "It was having fill speakers around the lip that the old system really lacked," believes Tim Wright.

In addition to providing exemplary coverage, the new fit-out also meets the aesthetic requirement, since the ceiling is now painted black, and the speakers blend in seamlessly. Michael Hoskinson is also delighted to have the subs up in the air, noting that while the trim height of the hang is now lower than previously it does not intrude on the two-screen projection set up. "The whole thing looks really sleek now," he says.

When Martin Audio's Will Harris came to commission it, "as soon as it was physically turned on it sounded great," according to Wright. "It soundedexactly like it looked on the engineering document. Any DSP that was needed was built into the amps. [iKON] is a complete process-controlled amp for a good reason because it is designed to work together [with TORUS]."

And Michael Hoskinson shares his enthusiasm, particularly since congregants are reporting widespread satisfaction and enjoyment of the new array. And with the fast turn-around of activity within the church he knows that in the coming months they will be throwing a lot at TORUS. "These speakers can expect to be getting pumped harder than they would normally expect," he exclaims.



TORUS Chosen for Perdido Bay Methodist Church's New Sanctuary

Perdido Bay United Methodist Church, Florida, USA

hen the Perdido Bay United Methodist Church in Florida was building a sanctuary out of the ground, optimum coverage and intelligibility from the newly installed sound system became top priorities.

The church's highly experienced audio-visual engineer, Kenny Stewart, managed the project, and after consulting with Brian Smith, VP at Pro Sound & Video, based in nearby Pensacola, his search led him to Martin Audio. He explained, "While narrowing down my list of equipment needs, Pro Sound installed a Martin WPM array at First Baptist Church Pascagoula and my brother Kris Stewart (also at Pro Sound) mentioned how well that system performed.

"I was on board after hearing that feedback. I needed the whole system flown, adjustable patterns, a reliable manufacturer's input and assistance, and an overall clear musical system."

After considering other premium brands, his decision came down in favour of Martin Audio's recently introduced TORUS constant curvature array, purpose designed to fill the gap between a full-size line array and a point source solution. Kenny Stewart and brother Kris then set about the installation process. The new space is

> **"MARTIN AUDIO'S TORUS, COUPLED WITH THE SXCF118, IS POWERFUL AND EXACTLY THE SPEAKER SOLUTION FOR MY NEEDS**

a standard rectangular room with left seating, centre aisle, and right seating, with approximately 75ft from the stage to rear seats and 35ft wide seating sections. Setting out the criteria, he said, "Going into this new sanctuary, I wanted quality equipment in all aspects of the AV system. I specifically needed the ability to have a speaker system that delivered precise coverage, while limited floor space meant I needed to fly the subs."

He designed Left/Right array hangs each consisting of a pair of SXCF118 subwoofers, three TORUS T1215 with a single TORUS T1230 at the base.

TORUS perfectly met the requirement for adjustable pattern control. Designed for applications that typically require a throw between 15-30m, T1215 offers a narrow vertical pattern of 15° with a flexible horizontal pattern that can be manually adjusted between 90°, 60° or 75° while the T1230

offers similar attributes, but with a vertical pattern of 30°.

As for the subs, Stewart said, "Having not heard these subs in the air I worried about having enough output. But I am shocked at how clean and loud the low end is from just four flown SXCF118," he exclaimed.

The system is powered by three Martin Audio iKON iK42 4-channel amplifiers, with all speaker processing taking place within the amps.

This new PA rig delivers more than sufficient SPL to cater for the two Sunday services—one a traditional service with choir, grand piano and soloist, the other more contemporary, with a full worship band and vocalists.

In summary, Kenny Stewart said, "The TORUS line really delivers and surpasses all of our needs.There's no treatment on the walls and I don't foresee us needing any. Martin Audio's TORUS, coupled with the SXCF118, is powerful and exactly the speaker solution for my needs."

Balanced Input Upgrades Historic Cochran Chapel with CDD

Cochran Chapel, Phillips Academy

Mark Waker, owner of the New England-based integration and consulting firm Balanced Input, faced a variety of challenges for an audio upgrade at Phillips Academy Andover's historic Cochran Chapel.

In addition to two lines of large pillars that run the length of the building and obstruct the passage of sound, the Chapel walls have 10 ft. high wood paneling running around the space along with the wooden pillars and pews, all of which contribute to reflectivity that can further impact audio reproduction. Fortunately, Martin Audio CDD12 speakers would help in providing a one of a kind solution to overcome these challenges.

Phillips Academy, a private boarding school founded in 1778 with a list of prominent alumni that includes former presidents George H. W. Bush and George W. Bush, originally dedicated the Cochran Chapel in 1932. The historic space underwent an extensive renovation in 1998 to expand the balcony and seating and add projection screens, but the audio coverage still fell short.

Discussing the recent audio upgrade, Mark points out, 'the system had to provide superior audio for the wide variety of events held in the chapel including school functions, weekly worship services for different faiths, weddings, concerts and recitals by high profile artists such as Yo-Yo Ma and Bobby McFerrin along with guest speakers like Spike Lee and Jane Goodall.

"THE STAFF FELT THE SYSTEM SOUNDED SPECTACULAR WITH EXCEPTIONAL CLARITY THROUGHOUT THE SPACE AND SMOOTH, EVEN COVERAGE IN WHAT WAS A PACKED HOUSE.

'Of course, the biggest challenge was overcoming the problems posed by the two lines of pillars which are such a huge obstruction the school had to install the large projection screens to the left and right of the altar so people in the side aisles can see what's going on in the center.

'That, plus the reflectivity caused by all the wood in the space which further impacted the original sound system, large arrays installed on pillars toward the front of the space. The system fired right into the other pillars, causing a dead zone behind every pillar, and didn't provide adequate coverage for the expanded seating area in the center balcony.'

Mark had to design a new system that would expand the coverage so everyone in the chapel could hear the message that also had to be virtually invisible to preserve the aesthetic integrity of the historic space and complement the projection screens which can appear and disappear at the touch of a button.

As he points out, 'Usually, if you can't see a speaker, you probably won't be able to hear it either. It should line up with the listener at some point. After trying several different approaches, I realized the best way to go was something that had been tried before; installing the speakers high above the seating area inside the wooden archways at the top of the pillars. But that approach hadn't worked ultimately because the speakers weren't up to the task.

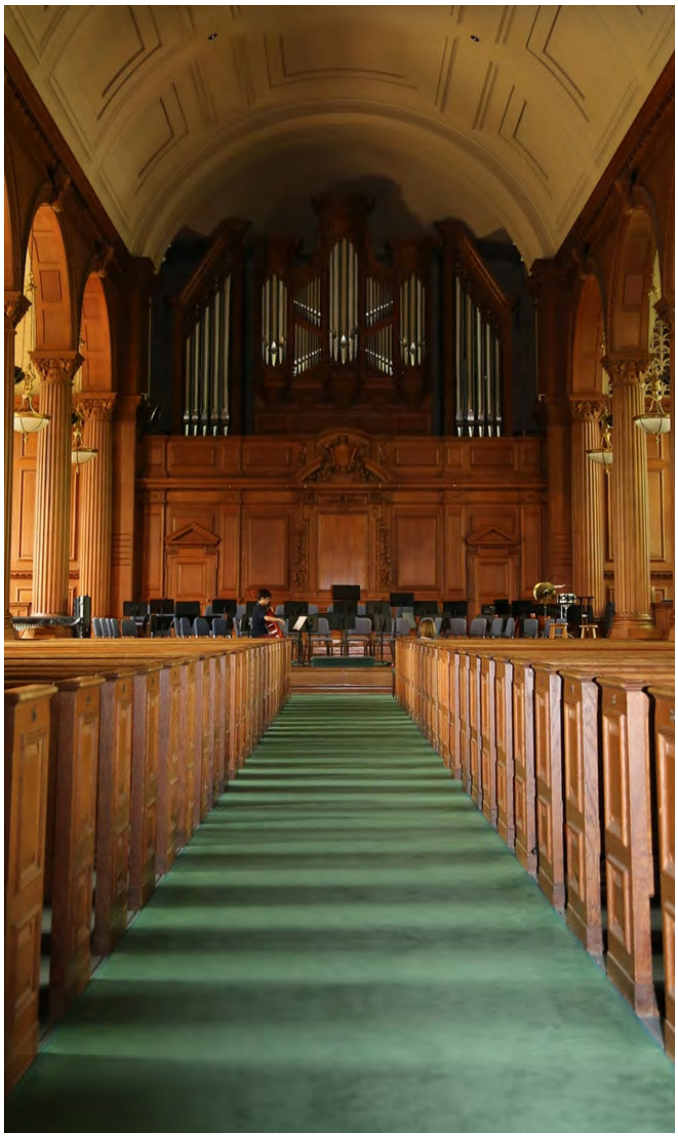
'Fortunately, Martin Audio had come out with the CDD12, the only speaker that could succeed in that particular application because the horizontal dispersion is wider close in the nearfield and gets narrower as you move away from it. In addition to the unique dispersion pattern, the fact that it's coaxial gave us a relatively small point source that fit the coverage we needed, which we couldn't have done with a conventional 12' two-way speaker.'

To provide the coverage needed to the people behind the pillars, Mark divided the chapel into 12 specific zones, six on the left, six on the right, with a speaker dedicated to each zone. Each of the 12 zones has a CDD12 driven by one channel of a Martin Audio MA2.8Q amplifier with its own processing channel from the DX0.5 Loudspeaker Management System. Three of the amps drive all the speakers and each speaker is flown at about 32° up from horizontal and mounted with custom brackets.

In addition to the CDD12's, two CDD8's serve as outfill for the faculty seating at left and right of stage and two others are angled inwards as onstage monitors for the performers and speakers. Martin Audio C4.8T ceiling speakers are used for under balcony coverage. The audio system also included the school's repurposed Yamaha 01V digital mixers along with Shure, Countryman Associates, Audix and Audio-Technica microphones.

As Mark sums up, 'the faculty and AV staff at Phillips Academy is really pleased with the upgrade. They put the system to an initial test at an all school meeting. Their staff felt the system sounded spectacular with exceptional clarity throughout the space and smooth, even coverage in what was a packed house. And everyone appreciates the fact that the chapel has not been visually impacted by the speaker system. It still looks the way it did when it was first built because the technology is virtually invisible.

'The best sign of approval came when the Head of School looked over and gave us a thumbs-up almost immediately after starting his speech, which definitely showed that we had succeeded.'



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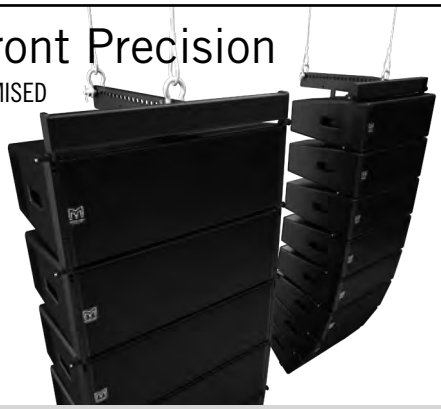

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