From snow to marble

The last time that Pro Audio Middle East saw Ateis Messenger XL line arrays they were thriving in sub-zero temperatures. Now, the same technology is being used in a very different way, as **Barney Jameson** discovers

IN ANY OTHER INDUSTRY, IF someone asked you what an indoor ski slope and an Orthodox Coptic church had in common, you could be forgiven for expecting a bad punchline to follow. But while it might sound like the set-up for a joke, for those who are interested in the progression of professional audio within the UAE, it's actually a very pertinent question. Why? Because the answer is Ateis.

Increasingly, the Ateis name is becoming attached to high profile projects within the emirates, particularly Dubai and Abu Dhabi, to the point that the loudspeaker manufacturer has caught the attention of the wider pro audio industry within the region. Partly this is due to the efforts of Ateis ME office, and the scale of projects with which it has involved itself. But the brand's growing reputation is equally being assisted by the flexibility of its Messenger system, a range of line arrays that take digital beam steering into installations as varied as, you guessed it, an indoor ski slope and a church.

The ski slope in question is of course Ski Dubai, the slope within a mall that was previously covered in depth in an earlier edition of *Pro Audio Middle East*. Within the slope's artificially freezing atmosphere, Messenger arrays beam audio in precise trajectories down the slope, precisely matching the course of skiers as they hurtle down to the bottom. With some help from smaller arrays along the course itself, the result is a seamless audio experience for Ski Dubai's patrons. It's an impressive system, and a still more impressive listening experience.

But having previously seen the Messenger arrays being used in such a unique installation does make it something of a surprise when you walk into the Orthodox Coptic Egyptian Church in Abu Dhabi – itself not the most expected of buildings in the UAE capital – and find exactly the same technology used to ensure high speech intelligibility for Christian congregations. Yet there are XL sized arrays, concealed behind golden mesh to the left and right of the sanctuary.

'Of course for Ski Dubai we have some environmental features which we don't need here,' jokes Haider Al Attar, referring to the system used in Ski Dubai to remove frost from the Messenger arrays. Nevertheless, smiles the technical manager, 'It's the same speaker, we just disabled this function. So it's one speaker that can fit all of these applications.'

The exterior of the Orthodox Coptic Egyptian Church

Nor should the church be considered any less challenging than the Ski Dubai installation. Indeed, the acoustic properties of the building have in some ways proved more difficult to master, given the wealth of marble used in the interior, and the varying uses for which the building must cater. The church itself, into which visitors enter having climbed a steep flight of steps outside, takes the form of a long cavernous hall with rows of seating to either side of a wide aisle. At the rear is a balcony, also with seating, while the stage area boasts not one but two lecterns, both of which are located directly in front of the Messenger XL arrays.

But as impressive as the main church area is, it's only the beginning of a much bigger installation. Directly below the main hall is a second, far smaller church, contained in a windowless room bedecked with religious iconography and its own sanctuary. Though the second church is a far more compact space than its bigger sibling, it plays a key role in the use of the Orthodox Coptic Egyptian Church, serving not only as a space in its own right but as an overspill room for the main auditorium. As a consequence, while the acoustic properties of the room may be easier to manage because of its size and shape, the decor nevertheless adds a dimension of complexity that cannot be overlooked.

Moving further still into the bowels of the building, visitors can discover a purpose-built theatre, as big as the main church space but designed and specified for live performance rather than worship. The hall boasts a large stage, a spacious auditorium and an infrastructure that is capable of catering for any eventuality, be it the full scale production of a play, a musical performance or the theatre's use as another church space. Indeed, when the main church was being constructed, it was the theatre hall that was used for all religious functions.

Finally, in the basement is proof positive that no area of the building has gone unused, with a maze of classrooms and study areas having been established using moveable walls. Soon, these classrooms will be filled with young people from Abu Dhabi's Christian community, but it wasn't always planned to be thus, with Ateis having little idea of what the basement's ultimate use would be as the building's system design was created. All that was known was the design had to flexible, catering for a wide range of possibilities.

'What is nice in the basement is that the walls are moveable so there can be different set-ups, but that created some challenges on the sound system design,' explains Mr Al Attar. 'It needed to be dynamic and customisable according to the set-up. That's actually everywhere. Even the theatre is sometimes used a church. That's why we have a comparable set-up in there, with the same number of microphones as in the main church. Any time they want to switch it's simple a matter of plugging them in.

'This is the only church of its kind in this area so when events are happening such as Christmas it's 100 per cent full, and even the basement will become part of the church. That fact created a challenge for the A/V system.'

Steering lobes

As much as the flexibility of the system was a priority during the A/V design stage, however, the chief concern at that point was still creating an audio system that could thrive in the challenging environment of the main church.

While many worship houses of the Christian tradition that can be found in the Middle East and Gulf adopt a low-key approach to their interior design, the Orthodox Coptic Egyptian Church is marking a proud departure, announcing itself instead as an example of Abu Dhabi's policy of religious tolerance. As a result both the main area and the smaller church are adorned with a wealth of grandly religious iconography, rich decorations and impressive architecture. While the result is certainly impressive, the acoustic properties of the space suffer accordingly – marble features largely in the construction, forming the floor, much of the walls and the ceiling. The entire hall is alive with reverberation, creating an area in which intelligibility would be at a premium for any professional audio system. Arguably the only element of the installation that eases the difficulty of the project is that in the main church at least, the audio system will only be used for speech as opposed to musical performance. However, Ateis – specifically designer Albert van der Hout – has coped with the difficulties of the space with just two XL arrays, plus two suspended balcony fills.

'This church has many marble surfaces and it's a very big space. That created a big challenge – it's very reverberant. That's why we came in here with our line array speakers,' confirms Mr Al Attar. 'We have two line array speakers here to get a stereo effect. The most important feature of these speakers is that we can shape the sound to reduce the reflection from the ceiling, from the walls and from the floor.' To create a system capable of avoiding the hard surfaces, Mr Al Attar explains, the lobes produced by the two arrays have been kept deliberately 'very narrow. We have two lobes here, one for the back and one for the ground floor. One covers the floor area directly and one small lobe also covers the balcony. But it was a challenge to work out how we could cover the entire area using only two speakers.'

CM800i loudspeakers within the small second church

The two loudspeakers that have been hung above the balcony – both are 96dB RS800i models – certainly help, but it is the arrays that cope with the main share of the space laid out before them. Moreover, making that task harder is the placement of microphones within the church. While the entire building is served by Sennheiser evolution wireless mics ('they are one of the best microphones,' says Mr Al Attar), the decision to locate the main church's two lecterns directly in front of the XL arrays immediately created feedback problems with which Ateis had to contend. The answer was to steer the lobes created by each array so that they would leapfrog over the microphone's position.

Albert van der Hout

'The microphone is directly behind the loudspeaker,' indicates Mr Al Attar. 'That could be horrible for feedback. So our challenge was to shape the lobe of the speaker to jump over the microphone. It's like a curve passing over the stage to reduce the feedback effect when the microphone is on. There's no feedback at all. It curves over the top and then into the auditorium.' To demonstrate, Mr Al Attar takes the microphone and stands against the left-hand array, announcing over the system that there is no feedback.

Elsewhere in the building the configurability of the design was the biggest challenge, with so many of its areas being used for multiple applications. As a consequence, the audio systems have been kept sensibly conservative. In the smaller church, for example, the loudspeaker installation comprises only eight-inch CM800i ceiling speakers, as Mr Al Attar explains: 'It's a normal church, not like the big space above, so we can use normal ceiling speakers. We didn't use line array in here – there was no need as it was a small room. The ceiling speakers are the same family as the RS speaker – CM means ceiling mounted, RS means rounded speaker. It has the same specification, only the mounting is different.' CM800i models are also employed throughout the basement area, where the moveable walls presented a particular challenge for Mr Al Attar as he set about designing a system suitable for an undefined use.

Marking a distinct break from the loudspeakers used elsewhere in the building meanwhile are the theatre's use of two Alcons Audio Q36 full range loudspeakers installed to the left and right of the proscenium. 'That's because this is for a very different application,' explains Mr Al Attat, pointing out that unlike the other locations in the building, there will be more than just speech passing through this system, and adding that Ateis

A Messenger XL array concealed within the main church

RS800i loudspeakers suspended above the balcony

(l-r) Electrical Engineer Mina Abd El Meseh, Ahmed Bairakji and Haider Al Attar

Bass Array technology would have been a solution had space not been restricted. 'The Bass Array couldn't be fitted here because it would take up too much space. We are flexible – there are some people using our systems and we are using theirs.'

Tying the entire installation together and providing for the required flexibility is a network comprised of Ateis LAPs (Linked Audio Processor), linking the building's locations via discrete racks in each space, with the largest example housed in the main church.

'All four of the locations and all four racks are networked using LAP using Cat5 cable, because there are short distances between the racks – less than 100-metres,' explains Mr Al Attar. 'There are three operation modes across the entire site. One is standalone, in which the local microphone output is going to the local speakers system. Then there's broadcast from the main church, so when something is taking place in the main church people can sit in the smaller church and still hear what's happening upstairs. Finally, sometimes when they stage plays or concerts in the theatre they want the facility to broadcast to other areas. So the third operation mode is to broadcast from the theatre. That's why we have a selector hidden in the main church, and the operator can select which operation mode they want.'

As impressive as the flexibility that has been invested into the audio design is, however, the most striking element of the Orthodox Coptic Egyptian Church's new sound system is the use of digital beam steering to negotiate the main church's interior.

Thanks to the technology, the building has neither compromised on its aesthetic appeal nor the quality of its audio. While it might be difficult to draw a connection between an indoor ski slope and a church in any other context, Abu Dhabi's new church proves that when you apply leading edge audio technology to either, the end result is no joke.

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