



Intelligible Sound Solutions for Acoustically Challenging Spaces



BOSE Panaray® MSA12X Digital Beam-Steering Loudspeaker

- ◀ Digital beam-steering line array column loudspeaker with onboard DSP and 600 watts (12 x 50 W) of amplification
- ◀ Family sound profile with the Panaray MA12EX Loudspeaker
- ◀ Twelve (12) x 2.25-inch full-range transducers
- ◀ Dante® digital audio network interface and line-level analog input
- ◀ Articulated Array® configuration allows wide, 160° horizontal coverage
- ◀ Modular design allows building vertical arrays using 1-3 units
- ◀ Multiple algorithms for beam steering control



Atrium



House of Worship



Airport

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Houses of worship | Auditoriums | Transportation facilities | Conference Rooms | Lecture Halls

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Providing intelligibility of speech under the dome is paramount



Imam Fahmi can recite the entire *Quran* by heart



L-R MA12EX Panaray column speakers are fixed to rising columns by Bi-Pivot brackets

Consistency and intelligibility under the dome

Richard Lawn discovers how one Singaporean imam has brought his experience of Bose loudspeakers in Mecca back to his Hougang mosque

HAVING BEEN RAISED ON THE

Indonesian island of Lombok, Fahmi Hamdan Ali spent 11 years furthering his faith of Islam in the holy city of Mecca. Having learnt to recite the entire works of the *Quran* by heart, the devout Muslim is today the renowned resident imam at the En-Naeem Mosque in the Singaporean suburb of Hougang. Here, he critically monitors his own vocals relying on the assistive listening of AV Links Communications [Asia] team engineers.

During his time in Saudi Arabia, Imam Fahmi gradually became more accustomed to the qualities of Bose loudspeaker performance. 'I was particularly impressed with the clarity and intelligibility of their speakers,' comments the resident imam. 'In Mecca, Bose was the benchmark and I learnt to distinguish the difference between their speakers and other brands. It's important that I protect my voice, so I need to accurately hear it.' Having earmarked an audio upgrade for the mosque, Imam



Masjid En-Naeem is a commanding landmark in the Hougang suburb

Fahmi requested a demonstration from Bose supplier and SI, AV Links Communications.

'Other engineers find it difficult to interpret my terminology, but the team engineers at AV Links Communications fully understood and appreciated the vocal projection I required for my sermons.' Suitably

impressed by the clarity of a Bose Panaray loudspeaker system during the demonstration, the mosque was supplied with a partial Panaray system for further evaluation over the course of several weeks. During that time, Ham Dan and his team of engineers were frequently requested to fine tune the system and provide

expert analysis for the imam. 'My phone would sometimes ring in the middle of the night,' laughs Ham Dan. 'If I sent my team engineers, however, Imam Fahmi would insist I return.'

Imam Fahmi needed to have his request for the upgrade approved by the mosque committee. 'Overall, price was probably the most important consideration. I explained that the added cost of a Bose system was a good long-term investment both in terms of sonic quality, even dispersion and protecting my vocals.' The committee approved his request and, following simulation analysis using the Bose Modeler software, AV Links Communications engineers, headed by Mohd Firdaus Lam Bin Yismin Lam who holds a BSc in audio engineering from the University of Highlands and Islands in Scotland, set about designing and then installing the components of the Bose Panaray and FreeSpace loudspeaker system into the worship space.

'Despite it being a Bose system, I could keep the design within



Bose Professional's Yusof Ahmad and AV Links Communications' Ham Dan with Imam Fahmi

budget as these speakers provide a wide coverage area ensuring fewer speakers are required,' explained Ham Dan. Delivering 160° wide horizontal coverage with a narrow 20° vertical pattern control, L-R MA12EX Panaray column speakers are fixed to rising columns by Bi-Pivot brackets on the ground floor and balcony. Combining 12 2.25-inch drivers, the speakers are tailored for this low-ceiling application, improving the throw distance while reducing ceiling reflections.

The peripheral areas are adequately served by 12 DS40F 4.5-inch ceiling speakers that provide a 125° conical coverage pattern. Higher SPLs were required for the central worship space immediately under the dome

and this has been catered for by wall-mounting two DS40-SE and four DS100SE cabinets at a 3m height. By sharing identical voicing components and characteristics, the FreeSpace speaker models provide a consistent tonal quality within the mosque. A single PowerMatch PM-4250 4-channel amplifier powers the zone featuring the MA12EX models, while four FreeSpace IZA 2120-HZ 2x120W integrated amplifiers cater for the DS 40F and DS 100SE low-impedance models located in the other four designated zones.

A 16-channel Soundcraft Signature 16 analogue console receives inputs from various Shure SM58S handheld microphones used for

Fajr, Dzuhur, Asar, Maghrib, Isyak and Kuliah prayers. Digital audio processing settings for the imam for the six prayers have been individually configured and stored in a Bose ControlSpace ESP-4120 4x12 fixed analogue processor which comes with an 8-channel ESPLink output. Although the call to prayer changes little in an equatorial country, the different daily settings still required tweaking and storing in the ESP-4120. Located in the rear changing room where the racked equipment is also based, a wall-mounted Control Panel 7 and Pro controller from Australian manufacturer CommbOX provide an on/off switch, individual presets for the six prayers and Friday prayer settings.

Audio effects processing has also been applied to the selected microphone channels through a Lexicon MX200 Dual Reverb FX Processor set to large hall/arena for some natural reverb. Two Furman PS-8RE III processors provide surge protection and electronic sequencing when powering on and off.

'The imam is very sensitive to changes and insists on volume levels being consistent and that no one tampers with the settings,' furthers Ham Dan. 'During Ramadan, he recites the entire *Quran* over 30 days,



Four FreeSpace IZA 2120-HZ models and a single PowerMatch PM-4250 amplifier power the Bose speakers

during which time he has to take particular care of his voice.' Fluent in three languages, Imam Fahmi demands consistency of speech. The various Bose loudspeaker components specified, tuned and installed by AV Links Communications has achieved that while providing the worshipper with an enhanced service.

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