

Experience matters

The Commonwealth Games in Delhi opted for experience and pedigree when it came to the audio systems at its newly built venues. **Richard Lawn** reports



The spectacular opening ceremony at the Jawaharlal Nehru Stadium

HELD BETWEEN THE 3RD AND

14th October, the 2010 Delhi Commonwealth Games (XIX Commonwealth Games) was the grandest and most prestigious sporting event to have been hosted by India in recent history. A total of 6,081 athletes from 71 Commonwealth nations and dependencies competed in 21 sports and 272 events in what was the largest international multi-sport event to be staged in the Indian capital city. The opening ceremony held at the Jawaharlal Nehru Stadium, showcased a modern India to the rest of the world and in doing so put an end to a crescendo of bad press that had besieged the organisers in the run up to the event. Luckily, its choice of sound reinforcement and emergency evacuation sound systems that were installed in the thirteen newly built stadia wasn't left to chance, having called upon the expertise of both Bosch Communications and Harman.



The Jawaharlal Nehru Stadium was installed with 132 EV XLC127 DVX line-array cabinets

Late repairs, such as the resurfacing of the damaged track and the laying of grass on bare parts of the in-field, were made at the Jawaharlal Nehru Stadium right up until the start of the opening ceremony. But a widely-praised opening ceremony helped to improve the image of the Games, and the concerns that had been raised during the build-up proved largely unfounded as most events progressed smoothly.

Harman's authorised Indian distributor Hi-Tech Audio Systems provided the audio systems for

the eye catching opening and closing ceremonies. The images were beamed to audiences across the globe, showcasing the best of Indian history and culture to a spellbound crowd of 60,000. During both of the ceremonies, the audience experienced hi-definition audio systems via a 100 JBL Vertec speaker system, ensuring that everyone from the front row to the back seat on the top tier of the stadium could enjoy and

feel the impact of the music that accompanied in the ceremonies. The entire system was powered with Crown IT HD amplifiers, whilst mixing was entrusted to a Soundcraft Vi6 digital console. HiQNet system architect was used to remotely control every single speaker in the venue.

Competition was heavy to supply the many new stadia that were used during the two weeks of competitions, but the organisers plumed for experience and pedigree. Bosch Communications has scored notable sporting successes in recent years, particularly with the 2006 German and 2010 South African FIFA World Cup Finals, whilst Harman triumphed at the 2008 Beijing Olympic Games and the Shanghai World Expo 2010. Harman were awarded the contract to supply sound reinforcement systems for 10 venues at the Commonwealth Games, whilst Bosch landed the contract to equip two venues including the main Jawaharlal Nehru Stadium.

Hi-Tech Audio Systems provided the Harman products specified for the bulk of the sporting venues.

The technical experience gleaned over the past 20 years ensured Hi-Tech Audio Systems were seen as a reliable partner for the project

and a team of Hi-Tech and Harman engineers set to work in September 2009. The initial meetings sought a thorough understanding of the unique structures and different requirements of each stadium and, as such, were configured and installed in an exclusive manner. Audio requirements were strategically planned and executed, whilst conforming to the architectural and specific requirements of the sporting events.

Work on the Games' venues was originally scheduled to end by 1st August but the unusually heavy rains during the monsoon season inevitably created delays. In addition to Delhi's infrastructure woes, there were highly publicised accidents such as a collapsed bridge at the Jawaharlal Nehru Stadium and a damaged ceiling at the weightlifting stadium. Unlike many of the other contractors on site, however, the meticulous planning paid off and the Hi-Tech and Harman team installed the sound systems well in advance of the games.

Jawaharlal Nehru Stadium

The largest venue to be used for the XIX Commonwealth features a permanently installed audio system from Electro-Voice. Designed by the EV team in Minnesota, US, Bosch India supplied and installed the entire system. The 60,000-seated capacity venue comprises 132 customised XLC127 DVX line-array cabinets, 120 Sx300PI speakers for under balcony and lower stand areas, 300 Evid 6.2 for concourses and 60 ZX5-60PI surface-mounted systems for the entrance area, all manufactured to exceed IP55 standards for weather resistance.

The entire speaker system is driven by a combination of 125 P3000RL and TG7 Tour Grade amplifiers to deliver an average SPL of 107dB. The system is remote-controlled and supervised from a single laptop in the stadium control room, all via EV's Iris-Net software platform. This design incorporates seven NetMax N8000 networked signal processors equipped with AI-1 NetMax analogue input AO-1 8-channel analogue output and CM-1 NetMax CobraNet network module cards. The system's Auto Gain Control is capable of increasing or decreasing the sound levels when the changes in the level of ambient crowd noise are detected. All the external speakers were manufactured to exceed

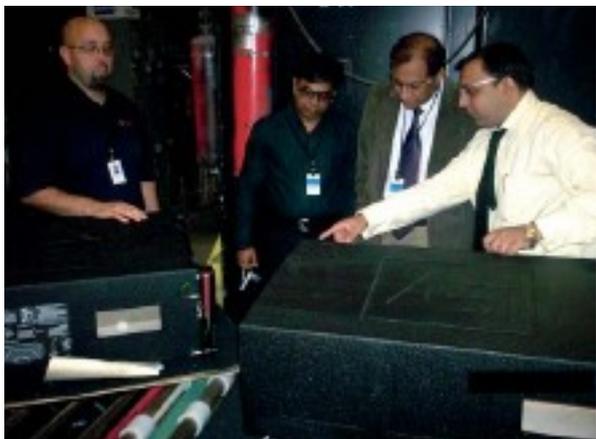
the IP55 standard for weather resistance, while the system's speech intelligibility surpassed the approved standard of 0.55 RASTI.

'Given the prestige value of the Jawaharlal Nehru Stadium, we were up against some very stiff competition for this project,' comments senior manager of product marketing at the EV Professional Sound Group, Tushar Srivastava. 'We therefore opted for one of our most trusted line array speakers – the XLC 127 DVX.' The stadium also installed two Midas Pro6 48-channel digital mixing consoles configured as 48/24+3 systems for fibre optic connectivity with another Midas Pro6 mixing system which has been customised as a 64 mic/line input configuration together with a Midas modular I/O Box inserted with a DL441 8-channel analogue input card. The stadium also took delivery of a full EV microphone collection comprising 12 N/D767a vocal mics, four Cobalt C04 vocal/instrument mics, 12 RE90H hanging-style condenser mics and 18 PC Desktop-12/Desktop-18 gooseneck mics.

Superintendent engineer of the Central Public Works Department for the Government of India, Sandeep Mehta was gushing in his praise of the system installed in the iconic stadium. 'I've seen a lot of installations around the world, but this is one of the best in the world. We are very satisfied with the quality of Bosch products supplied, the sound quality and the reliability certainly is world class.' Similarly, electro-acoustic consultant Mr I N Basu had observed the proactive contributions of the Bosch team during the project. 'EV has been a household name in our circle for well over a decade,' he states. 'The audio quality we have in the Jawaharlal Nehru Stadium is excellent and I think it stands out from any other installation in the world. Bosch has created a landmark installation in our country which will probably never happen again as this kind of event doesn't happen very often.'

Chhatrasal Stadium

Selected as the training venue for track and field events, the site had to undergo a major renovation at a cost US\$ 15 million prior to Delhi chief minister Sheila Dikshit gracing the inauguration of the upgraded stadium. A newly installed PA system comprises



Officials from the Central Public Works Department / Government of India visited the EV factory for an acceptance test

34 EV Sx250, 300PI and SxA250 series cabinets in addition to 20 Evid 4.2t ceiling speakers, all finished in white so that they could blend with the architecture. The cabinets have been evenly



12 clusters of JBL VRX932LA cabinets were installed in the Wrestling Stadium



One of the JBL VerTec ground stacked arrays that provided sound reinforcement for the opening ceremony

spread throughout the venue and are mainly pointed down for wider dispersion and towards the field for voice evacuation. The entire system is powered by 13 EV CPS 4.10 and CPS 4.5 4-channel amplifiers, whilst RCM-810 Remote Control Modules allow the amplifiers to be integrated into a remote control network.

An EV NetMax N8000 digital matrix controller manages the loudspeaker network and has been inserted with AI-1 and AO-1 cards for analogue input/output, APD4+ cards for antenna and power

distribution and CM-1 CobraNet networking cards. Dynacord CMS 1600 and PowerMate PM1600 mixing consoles have been installed into the sound booth for distributing the programming and announcements throughout the stadium. EV PC Desktop-18 and PC Plus-18 gooseneck podium microphones together with PL44, PL84 and PL84S vocal microphones, RE2-L21 and RE2-N2 wireless microphones, RE90H hanging microphones and REV-D dual receivers completes the signal chain.

Indira Gandhi Sports Complex

The largest indoor sports arena in India was used for gymnastics and wrestling events and is spread over an area of 102 acres with an intricate audio and lighting system.

Indoor Wrestling arena

With a seating capacity of 6,932, this arena provided unique acoustic challenges. The requirement was for a high output, directional, full range speaker which irradiated sound in the audience areas only. Powered

by Crown I-Tech 4000 and CTS2000 USP amplifiers, 48 JBL VRX932LA line array speakers were distributed in 12 clusters of four providing intelligible sound throughout the venue's seating areas. Subwoofers weren't required. A Soundcraft Vi4 digital console and BSS BLU signal processors were used for mixing and digital signal management respectively, whilst AKG D3700/D5, GN 155+CK31, WMS 4500 HT and WMS 4500 PT microphones were further utilised.

Gymnastics Arena

The ring in the centre is surrounded by 14,348 seats on steep sloping terraces, and so given these tricky acoustics a line array solution was called for, in which 64 JBL VerTec VT4888 cabinets together with 48 VT4880 subwoofers were deployed. All the speakers are suspended 20m above the ground from the catwalk above the centre of the arena, pointing towards the audience. This arrangement provided a consistent response in the audience areas in terms of speech intelligibility, coverage and frequency response. AKG wired and wireless microphones were extensively used for announcements, and a Soundcraft Vi6 digital console was used for mixing.



The huge expanse of the Indira Gandhi Sports Complex is catered for by an extensive JBL VerTec system

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