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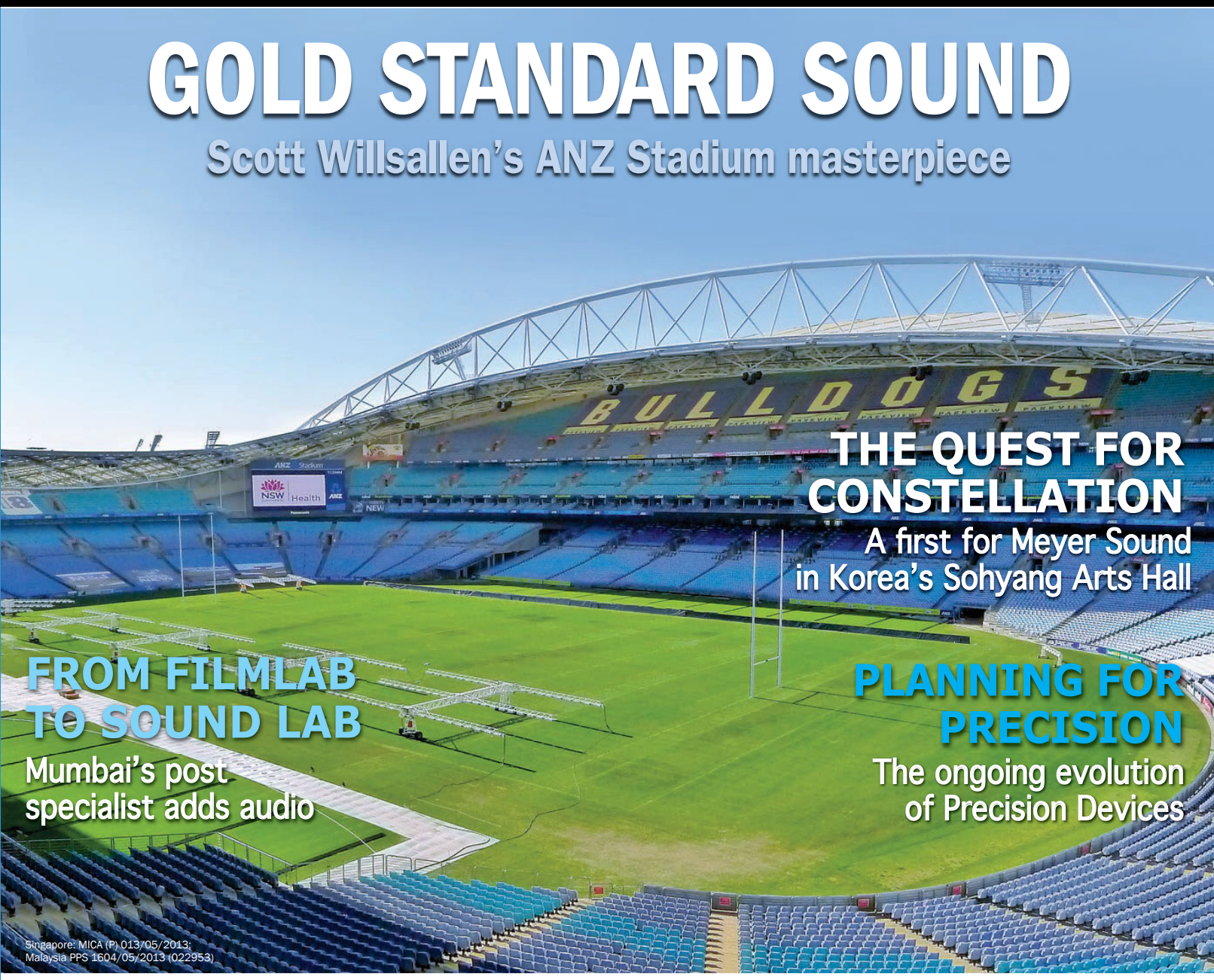
GOLD STANDARD SOUND

Scott Willsallen's ANZ Stadium masterpiece



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The gold standard

Scott Willsallen has completed a landmark install at Sydney's ANZ Stadium, equipping it with a PA system unlike any other in stadia sound

IF EQUIPPING A SPORTS STADIUM can ever be considered a personal project, then audio consultant Scott Willsallen of Auditoria Pty Ltd has just completed one of the biggest labours of love in his already storied career. He is already hailed as a leading voice in the field of sporting sound, but his most recent project – delivering a new audio system into Sydney's ANZ Stadium – surely counts amongst the closest to home. It was also the first in which he was asked to design a permanent sound system in a sporting stadium of such magnitude.

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'As an Australian, it was an absolute honour for me to be asked to design the system in ANZ Stadium,' he says.

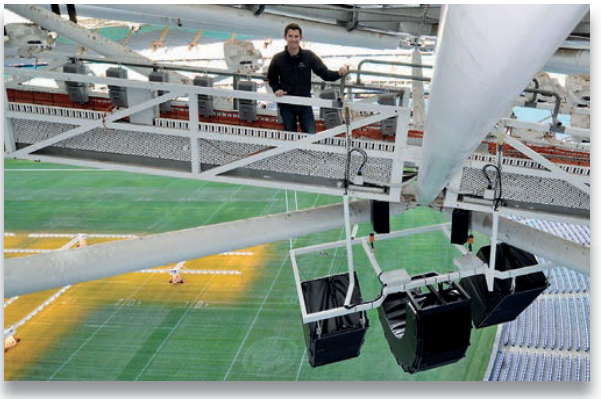
But nothing short of a ground-breaking installation was ever going to be good enough for ANZ Stadium, Sydney's former Olympic venue. While too many Olympic stadia are allowed to decay once the fireworks have faded, ANZ Stadium has actively sought to remain a leading influence in Australian sporting life. When the time came for its audio systems to be upgraded, it was obvious from the beginning that something beyond the norm would be required, if only to match the investments made into LED in 2009.

'In the old days visual information was just scoreboards, now we have LED screens,' explains ANZ Stadium general manager Simon Davies. 'When we came to replacing the PA system we wanted to apply the same thinking. Since the stadium was converted from a 110,000-capacity to 80,000-capacity venue in 2003, and reconfigured to a multipurpose stadium, we have invested constantly to improve the visitor experience. So when the PA system came up for replacement we asked ourselves; what are the current requirements; how can we improve on that; and how can we future-proof the system?'

Future-proofing has always been a key consideration at ANZ. Originally completed in March 1999 for the 2000 Sydney Olympics, the venue was first known as Stadium Australia, and prior to its reconfiguration in 2003 it was the largest of its kind in the country. That title has now fallen to Melbourne Cricket Ground, with ANZ Stadium's reduced capacity leaving it standing proud in second place.

But what it lost in seating during the reconfiguration, it gained in flexibility. Changes included the shortening of the north and south wings and the addition of motorised seating to the lateral east and west grandstands. Now it plays host to a broad spectrum of sporting events and major music concerts.

The challenge of building on that legacy, continues Mr Davies, could only have fallen to one consultant. 'More than many individuals in stadium sound design, Scott Willsallen is closer to the event based side of sporting presentation,' he explains. 'Having been responsible for PA design for the opening and closing ceremony of the Olympics, the Commonwealth and the Asian games, he has that profound understanding of using stadium audio to enhance the visitor experience. That's exactly the level of excitement we wanted for our stadium.'



Scott Willsallen walks the catwalks in ANZ Stadium

The task at hand, however, was far more significant than simply improving on what was previously installed. 'With the systems I had previously designed for the Olympics and other major international sporting occasions, the premise had been to deliver a true concert quality experience with all the drama and excitement that implies,' says Mr Willsallen. 'That means providing the full bandwidth of audio energy, right down into the low frequencies to which audiences have become accustomed at large scale rock concerts; and at high energy levels.

'But stadiums don't take kindly to low-end audio, they are by nature highly reverberant spaces and the long wavelengths of low frequencies easily excite the building. With modern loudspeaker systems this is not an insurmountable obstacle but it does require the highest standards

of audio performance and design implementation.'

It also requires a budget as big as the ambitions of those leading the project. In attempting to deliver the kind of sound reproduction more usually found in opening and closing ceremonies, but on a permanent basis, Mr Davies and ANZ Stadium management hatched a plan to make the most of the stadium's existing infrastructure.

'The main confine of this brief was the use of pre-existing rigging points and all cable infrastructure from the old PA system,' explains Mr Willsallen. 'While that can be restrictive in one sense, it does mean that money saved on cabling and rigging – a not insignificant figure when considering a large stadium – can be applied to buying a better loudspeaker system.'

Stefan Goertz of d&b, who worked on the proposal and later provided design support, describes the process as 'incredibly fair and even handed. I had never seen such a comprehensive and balanced bid package before. In the initial stages there were four pages of voting criteria where he had evaluated many different facets; not just audio performance. Features as varied as weather resistance, construction integrity, the depth and ability of the manufacturer's support within the country.'

'My experience has tended to be with top tier product so when I assembled the bid package we invited no less than 18 manufacturers to submit designs,' Mr Willsallen explains. 'Representatives for all bidders were open for feedback, so we could comment on their proposals and they could respond to those comments.'

The final design is as inventive as the process which created it. The balconies and grandstands of ANZ are irregular, so the individual hangs had to be tailored to position.

'The interesting aspect of this solution is the SUBs,' explains Mr Goertz. 'We have flown Vi-SUBs on each side of the individual line arrays of Vi8 and Vi12 in a dipole arrangement. Why it is interesting is the benefit from the horizontal array of sub/top/sub for the relevant crossover range. The pure dipole arrangement of the two sub positions creates the dipole for all lower frequencies. So in modelling the time alignment between subs and top cabinets we have an additional electrical parameter to adjust the overall low-end dispersion. Thus we achieve a great advantage. The gains in low frequency pattern control made it well worth the effort.'

Using the existing hanging points required further invention. The east and west stands are covered by six clusters per-stand, four with 12 Vi8 speakers, two with 10 Vi8 speakers and all with two L-R pairs of Vi-SUBS. When in the forward position, the moveable seating platforms are fully exposed to the main flown arrays. However when in the retracted position – as is the case for Cricket and Australian Football – the rear half of the seating is served by 16 Ti10P speakers mounted on the underside of the East and West level 3 balconies.

'The geometry of ANZ Stadium is relatively simplistic and made for a precise modelling and simulation process with EASE software,' continues Mr Wallsallen. 'The most complicated part of the design was the four corners where the array from the long side of the stadium and one from the end zone converge in the front few rows, creating a triangular shaped gap in the lower bowl. The time relationship between these two arrays in each corner was optimised and then the gap filled with an additional Ti10 array, time aligned to suit. There are also Qi7 pairs in each corner to cover the extremities of the middle bowl seating areas.'

Returning to the selection criteria, meanwhile, more than just the speakers came under scrutiny. 'I also took an integrated approach to the installation process,' the consultant explains. 'Historically installers have forged relationships with particular loudspeaker brands, but it doesn't follow that the best installer for your project will necessarily have a relationship with the best manufacturer for your project. By separating manufacturer from installer in the bid process we got the best installer and the best equipment.'

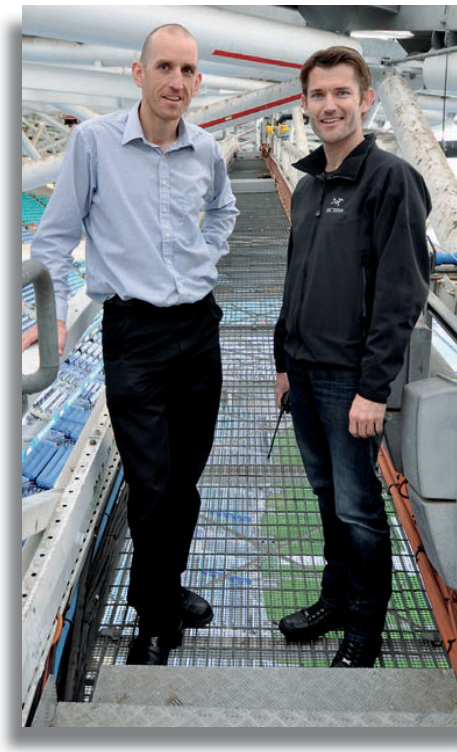
It was a bold step, but Mr Davies is quick to sing its praises: 'From our perspective it has certainly proved to be sensible, and has benefited the stadium in several ways.'

And there was more. 'As well as separating the installation contract from the manufacturer's proposals I included the maintenance contract within the installers bid,' Mr Willsallen continues. 'If you think about it this really is best practice, it keeps the bidders competitive. Separating these two elements leaves the client open to exploitation; bidders could make an unrealistic discount on the installation, in the expectation that they can then recoup costs downstream on an inflated maintenance bid. By rolling these two elements into a single bid item the successful bidder has a vested interest in doing a really first class job on the installation to support their own maintenance programme.'

Brett Steele, project manager for The PA People, describes the installation process. 'Scott and Simon looked closely at the stadium's event schedule and overlaid a schedule of installation

A Dante digital network has been created with the addition of BSS Audio BLU326 and BLU-BOB processors

(Inset) Installing the d&b arrays *(Credit Scott Willsallen)*; Suspended d&b arrays firing onto the Grandstand



ANZ Stadium general manager Simon Davies and Scott Willsallen

'My experience has tended to be with top tier product so when I assembled the bid package we invited no less than 18 manufacturers to submit designs'

Nor was the choice of speaker brand a simple affair. The ultimate winner was d&b audiotechnik, with a system comprising V-Series cabinets and using the Vi installation variant models Vi8, Vi12, and Vi-SUB. It was supplied by the manufacturer's Australian distributor, National Audio Systems (NAS), and installed by The PA People (who also installed the stadium's original PA in 1999). But the speaker brand's journey into the stadium was by no means easy.

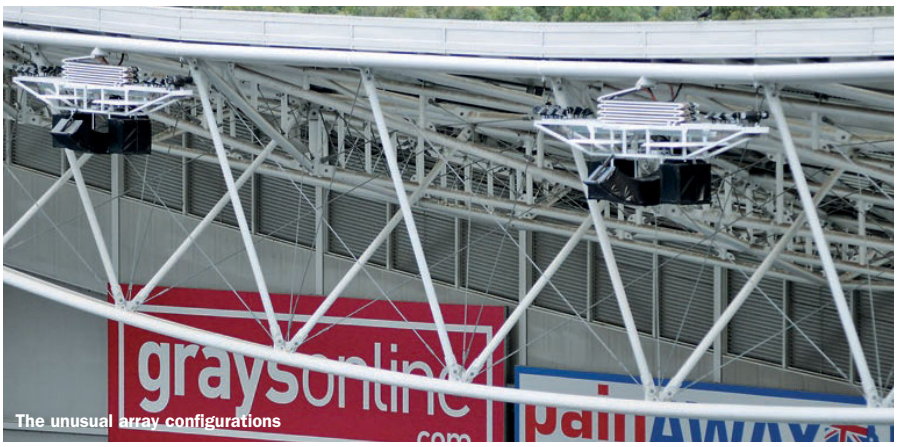
'To arrive at that decision Scott developed an exhaustive bid process,' recalls Mr Davies. 'It was so thorough that ANZ Stadium was able to give consideration to arguably every quality audio manufacturer in the world.'

upon it. They identified a prime period for the work in May – there were still matches to be played every Friday, matches that typically attract crowds of between 20,000 and 30,000, but the rest of each week was essentially free.

'So we did the work in four stages, replacing a quadrant of the existing system each week; detuning it initially so it performed to the lower standards of the remaining old system. NAS assisted us in this by delivering the loudspeakers and amplifiers direct to each quadrant as required so we didn't have to off-load the entire equipment package and then sift and sort each quarter as needed. With over 400 cabinets in total that was a big consideration.

'As for the physical engineering, we designed, built and installed the rigging system for the previous PA 15 years ago. We drew some legacy lessons from that, so each d&b array sits within a frame that resembles an inverted table. The table legs attach the frames to the catwalks beneath the roof; the frames in turn suspend the d&b flying frames that correctly attach and align the line array.

'This was similar to what we'd used before, but mechanically the rigging was a redesign – one good reason why we do all our engineering in our own metal shop. The d&b system is very light for what it is, so there were no issues there in terms of loading tolerance. Although they all look essexntially the same, each of our frames are different; you could say that two arrays diagonally opposed across the stadium are the same in terms of cabinet numbers, but chances are there would be a slight difference in the pan or the curve of the array; such are the irregularities of the roof.



The unusual array configurations


Flown d&b arrays

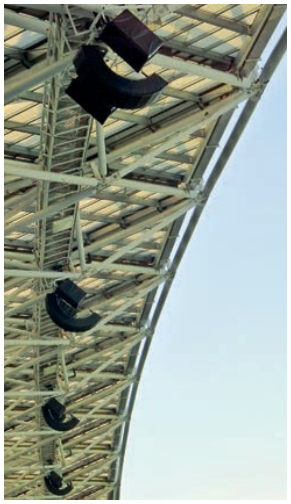

To ensure even coverage in the four corners of the stadium, Q and T series cabinets have been added to the Vi8, Vi12 and ViSUB arrays

One of the two LED screens installed in 2009

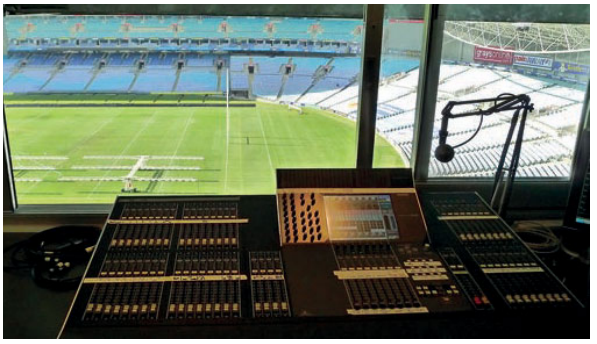
'We were provided with centre of gravity information for each individual array by the d&b engineering department in Germany – there is a need for a properly balanced load to facilitate ease of attachment to the catwalk. The frames are raised and lowered for service by two electric chain hoists supplied and installed by Jands Electronics. A two point lift balance is crucial so there was a lot of attention to detail.'

'Given the limited circuit count it's a huge advantage to have only eight loudspeaker channels at each rigging point. It meant we could put in more boxes'

The design was also confined by the pre-existing electronics locations. 'There are just four amplifier rooms, one in each quadrant, each driving six loudspeaker arrays of various compositions,' Mr Willsallen reveals. 'That was one of the defining factors that led to the choice of V-Series, not least the fact that it's a fully passive box. Given the limited circuit count it's a huge advantage to have only eight loudspeaker channels at each rigging point. It meant we could put in more boxes at each position. The original brief was for me to come up with as many options as possible from the existing rigging positions and cable infrastructure. From the eight loudspeaker circuits at each position we have allocated two of them to subwoofers in the final design. Subs were an essential ingredient if we were going to achieve the goals to which ANZ Stadium aspired. In terms of direct audio criteria the new design achieves higher quality and level, better coverage, and with double the box count than the previous system; but we've not added any copper.'


The east and west grandstands each boast six clusters of d&b audiotechnik Vi8, Vi12 and ViSUB arrays

The PA People also handled the amplifier installation, with Ash Moors dealing with networking infrastructure. 'We have upgraded the pre-existing fibre network with new switches and all associated hardware – everything except the fibre itself,' he says. 'The network handles all the audio signal traffic and the system control, split into several VLANs; d&b system control; and Dante for audio signals. Although we have put in double the number of loudspeakers than were here before we actually have less amplifiers – the d&b system is very efficient in that respect. We have a Yamaha M7CL desk in the control room with an AES card that outputs to a Yamaha DME64 for routing to various destinations, then out to two Lake cards for EQ, then into a BSS Soundweb London Blu-326 and then via Dante to the amp rooms. At the amp rooms the data returns to AES via BSS London processors to the amplifiers.'


Live, playback music and announcements are mixed on a Yamaha M7CL console

Mr Willsallen adds: 'With two Ethernet networks it was logical to split them between signal and control. There is also a copper ring back up for signal so should we lose the signal data ring we still have control and can tell the amps to switch to the copper analogue input.'

It is hardly surprising that Mr Willsallen's influence also extended to training. He passionately describes it as split into three parts – the meticulous way in which event crews must prepare the system; failure management and the high level of built-in redundancy (including spare amplifiers and loudspeakers); and the importance of training anyone who will interact with the system. That includes, he stresses: 'the operators, the maintenance team and the organisers that present in the stadium. Most of them have been presenting at ANZ Stadium for many years, but none are aware of the new system's amazing potential. Making them aware is most important.' In that spirit, an open day took place on June 13th.

'We want every operator that turns up here to be enthused by what they find,' insists the consultant. 'And we want them to buy into what's possible.'

Meanwhile, Mr Davies has achieved his goal of a truly future proofed, unique solution. 'We're not afraid to invest in the very best of class technology,' he reasons. 'Our asset management plan demands that the new PA system will have a lifespan of 14 years. We didn't want to merely install another public address system here – we wanted to set an example and push audio forward as a priority rather than a background requirement. You can feel the difference amongst the crowds now during the pre-match entertainment. These speakers are normally associated with the top theatres and concert halls around the world. As such, ANZ Stadium is equipped with a performance venue system.'

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