

THE ANZ STADIUM

A GAME CHANGER AT

JUNE FIFTH 2013 SAW NEW SOUTH WALES BREAK A SEVEN YEAR DROUGHT AND BEAT QUEENSLAND IN THE OPENING GAME OF THE ANNUAL STATE OF ORIGIN COMPETITION AT SYDNEY'S ANZ STADIUM. THE GAME WAS SIGNIFICANT FOR OTHER REASONS, NOT LEAST IT HERALDED A NEW ERA IN STADIUM AUDIO. IN THE SPORTING ARENA FORTUNE FAVOURS THE BRAVE, ATHLETES SEEK TO FIND COMPETITIVE ADVANTAGE BY SPOTTING AN OPPORTUNITY AND EXPLOITING IT. IT IS JUST SUCH AN ACT THAT HAS SEEN ANZ STADIUM SEEK TO GAIN COMPETITIVE ADVANTAGE OVER THE MANY SPORTING ARENAS IN AND AROUND SYDNEY. BUT, AS WHEN MITCHELL PEARCE MAKES A PROBING KICK THROUGH THE ADVANCING TANKS OF THE QUEENSLAND FORWARDS, ANZ'S STRATEGY ON ITS AUDIO SYSTEM WAS A CALCULATED RISK BASED ON CLEAR TACTICAL THINKING. SIMON DAVIES, GENERAL MANAGER OF ANZ STADIUM EXPLAINED.

BY STEVE MOLES
PHOTOGRAPHY BY SCOTT WILLSALLEN



"We took an active decision to up the stakes, to make our venue a much more exciting venue in which to enjoy the great sporting events we stage. To do that we had to break a few rules; people have avoided putting high performance audio into stadiums for a number of reasons, not least cost. Could we achieve a better experience for our customers? That's the big question."

"In the ten years since 2003 when the ANZ stadium was reconfigured from its original hundred and ten thousand capacity for the Olympics to an eighty thousand sports venue it has experienced a significant increase in the presentation of sport generally. We regularly host five different sporting codes. That change has been coupled with greater emphasis on enhancing the events, a big investment in two large LED screens, the largest in Australia at the time; more music for emotional content, more information via the PA and screens, better catering and improved quality of beverages. In the old days visual information was just scoreboards, now its LED screens with all the potential that brings. When we came to consider replacing the PA we wanted to apply the same thinking to sound as we did to visual information; what are the current requirements; how can we improve on that; and how can current technology future proof our investment?"

We engaged Scott Willsallen from Auditoria Pty Ltd as consultant; more than many individuals Scott's experience is closer to the event based side of sporting presentation. Having been responsible for PA design for the opening and closing ceremony of the Olympics, the Commonwealth and the Asian games, he has that understanding of using stadium audio to enhance the visitor experience; to use it as a dramatic tool. That's exactly the level of excitement we wanted for our stadium so we made the decision to raise the bar, to properly address major sporting events, to evoke more interest, and provide more enjoyment."

THE TASK

Aspirations are one thing, realisation quite another, as Willsallen explained. "The main confine of this brief was the use of pre-existing rigging points and all cable infrastructure from the old PA system. 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 eighty thousand seat stadium; that part of the budget can be applied to buying a better loudspeaker system." Willsallen is clear and purposeful in everything he says, it's not hard to imagine him engaging with world class events. He's also brisk and business like, nothing he says or does is gratuitous.

The system ANZ Stadium eventually settled on comes from the German manufacturer d&b audiotechnik. Based upon their latest medium format line array system, the Vi-Series installation variant of the V-Series with a full complement of Vi-SUBs, it also features T and Q-Series elements in subsidiary roles. The system was supplied by distributor National Audio Systems (NAS) and installed by PA People, a well-known Australian systems integrator. "But to arrive at that decision Scott developed an unbelievably thorough bid process," said Davies. "So thorough in fact that ANZ Stadium was able to give consideration to arguably every quality audio manufacturer in the world." Stefan Goertz from d&b audiotechnik who developed the initial d&b proposal agreed. "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 everything from audio performance through to weather resistance. The ability of the manufacturer's to support their products within the country, was also a critical factor."

BIDDING

"Before we engaged Scott as consultant we looked at other venues to set ourselves bench marks", continued Davies. "We wanted a PA that could deliver messages in coherent



FROM LEFT - GOERTZ, WILLSALLEN & VAYLER

PICTURED - DAVIES WITH WILLSALLEN



and a half hours including laying in turf over the tracks." He brings the same accuracy to his assessment of the task and doesn't defer to his consultant, taking an active role in the judging process, as we shall see.

"Scott has been advising here for a while now, since before we embarked on this project, so he knew the acoustical 3D space intimately. We impressed on him the need for the system renewal to achieve best value for money; that he has done."

Willsallen's approach to the bid was clear, "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." Davies was aware of the precedent, "As Stadium managers we are all too familiar with that link; so when Scott first presented this separation, stadium MD Darryl Kerry questioned if it was sensible. It has certainly proved to be so."

"My experience has tended to be with top tier product," continued Willsallen. "We invited no less than eighteen manufacturers to submit designs. Representatives for all bidders were open for feedback, so we could comment on their proposals and they could respond to those comments. By doing that with all the bidders we produced a short list of designs. Because all manufactures were involved throughout the competitive bid stage, all design options have been considered. That's better for the manufacturer, and still protects the final choice of product. Eighteen manufacturers was reduced through a number of empirical criteria to a short list of three for an in stadium shootout."

"The shootout involved me and MD Daryl Kerry," Davies continued. "We also invited maintenance and operational crew along. Initially Scott would listen but not comment, allowing us to form our own opinions. I would suggest my perceived differences, he would explain in technical terms why that might be so. As far as I was concerned the d&b system was the best choice. I'm no expert but the shootout process put this system head and shoulders above the existing system."

DESIGN

"When I first looked at renewing the system Shane Bailey Director of National Audio Systems, the d&b distributor for Australia, suggested the new V-Series," explained Willsallen. "From the point of view of stadium requirements the V-Series had several compelling features, not least the fact that it's a fully passive box. Given the limited circuit count (just eight channels at each rigging point) that's a huge advantage. It meant we could put in more boxes at each position. Most of the arrays are covering 130 degrees in the vertical plane so more cabinets is a real benefit; and the two models of loudspeaker Vi8 and Vi12, at 80 and 120 degree horizontal respectively, is also very useful. The cardioid V-SUB is also passive so were a single cabinet to fail there's no loss of cardioid behaviour from the other subs. Just one circuit to drive two V-SUBs; there's a certain elegance to that."

The basic installation is comprised of multiple hangs of d&b V-Series line arrays, with a line of V-SUBs hung as a dipole two and a half metres apart, to each side of the main array SUB/TOP/SUB. "The pure dipole arrangement of the two Vi-SUB positions extends the Vi-TOP array's constant pattern control towards lower frequencies via the crossover range between TOPs and SUBs, extending it down to the range exclusively delivered by the Vi-SUBs themselves." Explained Goertz. "So in modelling the time alignment between SUBs and TOP cabinets we have an additional electrical parameter to fine adjust the overall low end dispersion. Thus we achieve a great advantage, extending the control pattern of the Vi loudspeakers far down below 200 Hz. The benefit is a big reduction in unwanted low end energy in the troublesome areas of the stadium, thus over all a much cleaner sound across a broader listening bandwidth. This is uniquely possible using passive cardioid subwoofers by design to create such an array setup."

and comfortable fashion; provide the kind of quality musical enhancements to which audiences are accustomed in more acoustically friendly venues; and to have a PA system that can deliver proper support to a touring concert show, so those acts that come through don't have to spend seventy thousand dollars on delay systems for the side grandstands." Davies is a tall engaging Brit; like Willsallen, he has a firm grip on his own brief. Ask him a simple question about the movable grandstands and facts tumble like confetti. "The seating sections hold seven thousand people, are a hundred metres long and retract twenty eight metres. Each weighs three thousand five hundred tons and is shifted by fourteen motors: at one metre per minute, both sides takes three

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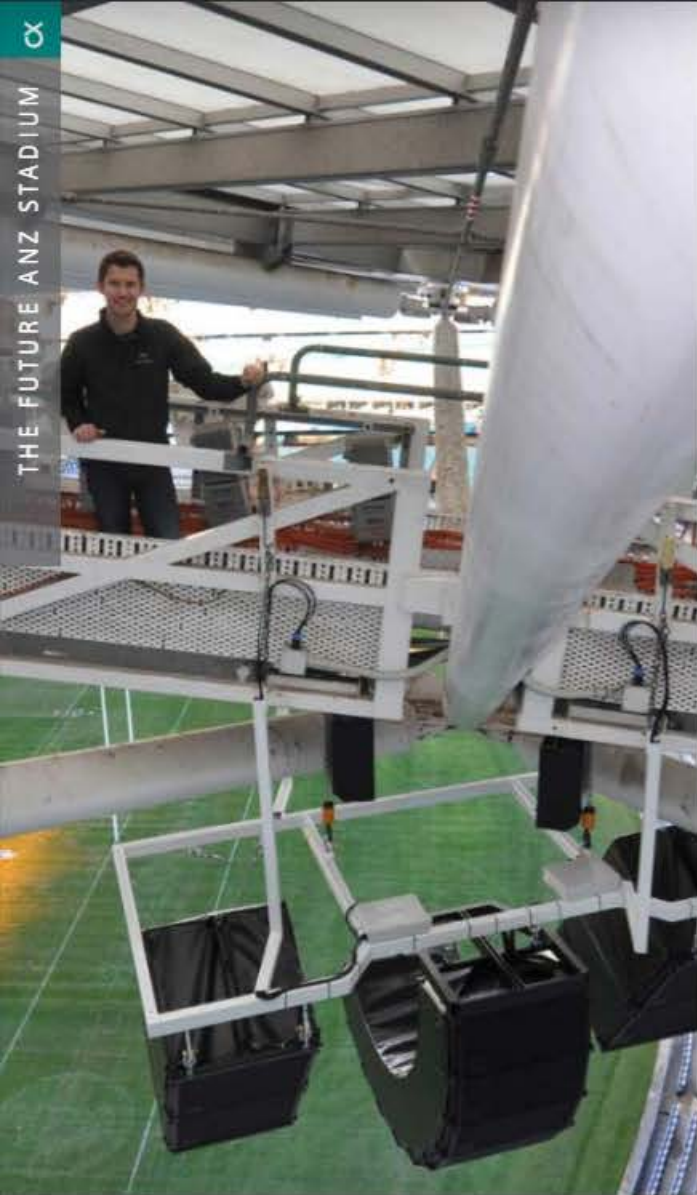
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THE INSTALLER

The installation of the d&b system was carried out by The PA People, the project delivered by Brett Steele. "Each d&b array sits within a frame engineered by us. Like an inverted table with the legs attaching the frames to the catwalks beneath the roof, the d&b rigging frames are suspended within. The d&b system is very light for what it is, so loading limits relevant to the roof structure were well within tolerance. Although many frames have the same number of cabinets each frame tends to be different in the pan or curve of the array, fortunately we do all our engineering in house in our metal shop. The frames are raised and lowered for maintenance by two electric chain hoists supplied and installed by Jands Electronics. We were provided with centre of gravity information for each array by d&b, the need for a properly balanced load to facilitate ease of attachment to the catwalk is crucial so there was a lot of attention to detail".

NETWORKING

Ash Moors dealt with the networking infrastructure of the stadium for PA People. "We upgraded the pre-existing network renewing all the hardware except the optical fibre itself. The network handles all the audio signal traffic and control to the four amp rooms, split into several VLANs, d&b system control; Dante for audio signal. Although we have double the number of loudspeakers than were here before we have less amplifiers; the d&b system is very efficient in that respect. There are two Ethernet rings, Scott had us split them between signal and control, there is also a copper ring back up for signal, which means should we lose the signal data ring we still have control and can tell the amps to switch to the copper analog input."

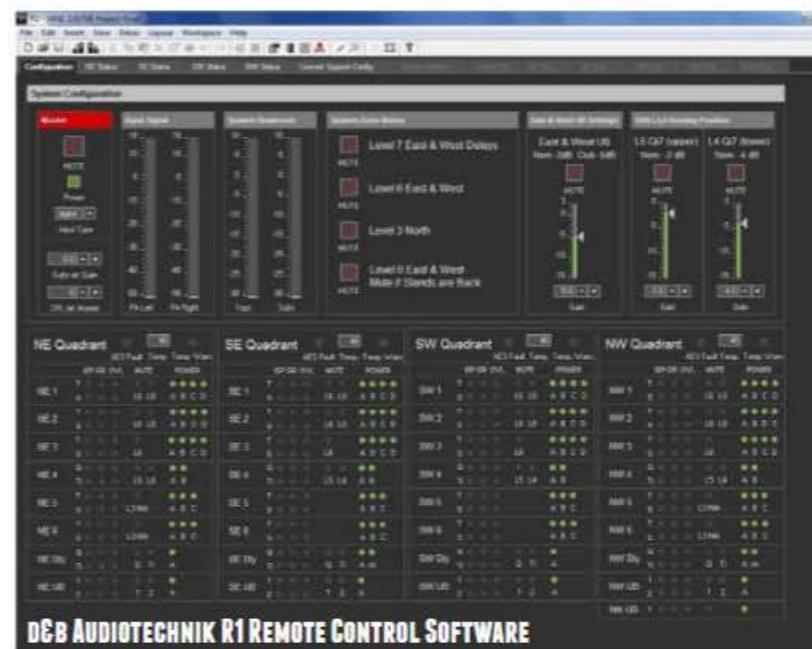
SERVICE, TRAINING AND MAINTENANCE

As you might expect, Willsallen has written a comprehensive specification, "Including the maintenance contract within the installers bid is really best practise. Separating the two leaves the process open to unrealistic discounting on the install, in the expectation that bidders can recoup costs downstream on the maintenance. They also have a vested interest in doing a really first class job on the install to support their own maintenance programme." The system is lowered, cleaned and serviced every six months, ANZ Stadium is home to a large number of birds and the special PVC environmental covers supplied by NAS quickly acquire a layer of guano.

"Training falls into three parts," Willsallen continued. "The first is preparing the system for an event: Gates are usually at 5 pm, the crew call is seven hours before and there is a comprehensive check list to go through. The d&b R1 Remote control software provides most of the information; once Stefan and I completed optimisation of the system we ran a 'system calibration'; this recorded all the impedance loads to the loudspeakers. The event crews use this for their test benchmark, but a listening test is always essential, and not just a quick pink noise thing. Operators implement the appropriate zone pre-set for which particular stadium configuration is being used and the anticipated grandstand use. They then walk the seating bowl and listen to each array."

"In terms of designing for coverage, and considering the legacy of pre-determined rigging positions, the d&b ArrayCalc provided fantastic information," continued Willsallen. "The geometry is very accurate, walk down a tribune and step over the fence onto the pitch and you're immediately out of the sound field." Not that this meant the final design was easy for him. "The corners around the LED screen positions are problematic, arrays 3, 4 and 5 straddle each corner, 3 and 5 comprise very long arrays giving coverage down to the front rows at the side and end. Array 4 is required to fill what is effectively a triangular section on the corner with its point touching the front row seats right where 3 and 5 meet. No loudspeaker projects such a pattern so it's tricky to say the least. The number 4 array is composed of a Ti10 array and Qi7s; the complexity comes in achieving the proper time alignment to cover the area without compromise."

"Away from the corners, the main arrays of Vi-Series in the north / south end zones take over all end grandstand coverage, consistent with the main east / west coverage. But as the end zone roof falls well short of the front rows, by as much as thirty metres, these arrays are practically horizontal in orientation though still highly curved. However, even at these distances we found that we only needed to apply about +3 dB to the cabinets covering the front rows compared with those covering the closer rear and middle seats."



"The second part of training is dealing with equipment failure. Amplifier or loudspeaker failure, how to replace and patch round. There is a spare D12 amplifier in each of the amp' rooms and we have special extension control (Ethernet) and NL4 loudspeaker cables so the replacement amplifier patches directly into the installation cable-loom of the system, removing the need to take out a screwdriver and pull amps in and out of the rack. That's one of the great things about this installation compared to many, the d&b D12 amplifiers actually have connectors on the back, not hard wire terminals, so a quick CAN-Bus assignment on the replacement amplifier plus a quick cable extension, and you're good to go. We also have replacements for all the loudspeaker types stored on site as part of the NAS supplier bid obligation."

"Finally, it's also necessary to give some training to all three groups of people who will interact with the system, the operators; the maintenance team; and in particular the users, the various team sports organisers that present in the stadium. Most of them have of course been presenting here at ANZ Stadium for many years, but none are aware of the new system's amazing potential. We want every mix/operator who turns up here to be enthused by what they find. And we want them to buy into what's possible; for them to feel involved and know they can get really great results, something that simply wasn't available before, is most important."

CONCLUSION

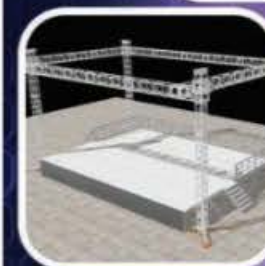
That process began on the 13th June with an open day at the stadium for just those people. "We stage forty to fifty events per year, at least six are full house, around thirty are audiences at about thirty five percent capacity, so all who came were very interested," concluded Davies. "From our position we are giving the people who hire the venue a new set of tools; if what audiences hear is uncomfortable, then even if you have got everything else right, the food, the staff, the seating, the parking, the one thing they will remember after the event is bad sound. With the new system Scott has designed for us things like pre-match entertainment and half time shows can be absolutely first class, so the new d&b system is a powerful tool. Clear, loud, intelligible, quality sound; this is a real game changer."

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Sydney
 Depot
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