

High Court of Australia

High Court of Australia Continues History of Innovation

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The High Court of Australia has come a long way since its first sitting in the Supreme Court building in Melbourne on October 6, 1903. Three sitting justices, a sandstone building and a sense that its very existence was not necessary pervaded its early years. Since that time, it has taken on monumental importance in the judicial system and has moved to Sydney and, finally, to its current official spot in Canberra.

Perhaps it was that peripatetic history that gave birth to the Court's current use of high technology, as those three geographically diverse seats of justice are still active even though the main structure now resides in Canberra. Because it is spread far and wide, the court has taken to using remote video for many of its preliminary hearings. This has caused a rethinking of technology in general, especially the audio and video aspects of the High Court's infrastructure.

The High Court realized it needed to bring its satellite courtrooms up to speed and thus ordered a revamp of 19A, the High Court room located in Sydney at the city's Law Court facility. It would require state-of-the-art technology, especially tricky in the audio domain as it would require careful balancing of the sound reinforcement, video and teleconferencing, and court transcription. It was imperative that all elements be treated with equal importance.

For sound reinforcement this meant multiple zones for speakers and microphones, all with



different EQ and processing and controlled from a central location, whilst court transcription and videoconferencing each have their own competing requirements that would tax any traditional automixer.

Naturally, they turned to the consultants who successfully designed the sound reinforcement systems in Canberra, acoustical design consultant Glenn Leembruggen at Acoustic Directions. In turn, design specialist Rod Louey-Gung of Integrated Media was tasked with overseeing the project.

The challenge essentially is that sound in a court room is really hard to do properly. This is partially due to the nature of the work environment, in which the participants are mostly seated motionless for hours at a time, or in the case of lawyers perhaps ambling about. Either way, comfort and, therefore, attentiveness become issues. "Comfort is very

important," asserts Leembruggen. "So the whole court design is focused around speakers, which for aesthetic reasons have to be ceiling mounted. Since we are most comfortable when the sound comes



Because the High Court of Australia is spread throughout the country, the court has taken to using remote video for many of its preliminary hearings.

toward us not from behind or above, exact speaker placement is paramount."

Regarding the roaming lawyers, this of course does not make for good microphone technique, causing acoustic consultants to focus on gain before feedback.

"These two issues necessitate line arrays in the ceiling," Leembruggen says, "steerable downwards so sound can come to you from the front, in order to take advantage of the microphone's directional properties."

The room is thus divided into multiple zones, with line-arrays each for the judge, lawyers and public areas. With the design of the arrays in 19A, they don't back bleed, so there is a strong intimacy

with audio because each individual is hearing his loudspeaker. Speakers are a derivative of Acoustic Technology's linear array, a customized

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AT ACOUSTIC DIRECTIONS

version, using a high frequency horn, in extruded housing, and Big City productions did all the mechanical work on the arrays.

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The microphones, too, are zoned, with one each for judges, associates, and counsel. Each has a mic delay relative to the other to provide optimum localization. Source localization and tonality require that there are fixed delays between the zones relative to each other.

Equally important has been the need to provide both group and combined output of the proceedings for digital transcription, and for video and teleconferences. "Automixers traditionally used in these systems are a difficult load for video conferencing and echo cancellation," says Louey-Gung. "It has been essential to tailor algorithms specifically for each requirement, something that is nearly impossible to do with traditional systems."

With such a complex design, a system is required to make it operate without having the nation's

highest level audio professionals on hand. Leembruggen and project manager David Gilfillan determined a networked, automated system was the only way to go, as they did in Canberra.

"We opted to use the BIAMP® Audia® system," states Leembruggen, "which is a multi-purpose box that allows simplicity of audio design while at the same time providing state-of-the-art technology in audio networking and software enhancement.

On top of this, the Audia handles the mics, which come into the system, go through equalization, routing, delay and echo cancellation. There is an automixer, the array signal processing and then the signal goes out from the Audia to the speakers.

Even though Leembruggen and Gilfillan had done this before, they didn't just fall back on old habits. "We started from scratch on this," he proclaims.

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Audia also cost effectively provides the necessary large number of processed outputs for the steered arrays and court transcription. Our algorithms that help shape the beam-steering of the arrays are proprietary, and we are able to confidentially embed these inside the Audia."

Introduced just over a year ago, Audia is a complete Digital Audio Platform available in two models, AudiaSOLO and AudiaFLEX. Both share common proprietary software, are set up via TCP/IP and both are drag and drop DSP-based units that can be configured to perform a wide range of mixing, signal processing and routing functions. AudiaFLEX includes up to 24 I/O channels in totally flexible combinations of inputs, outputs, and acoustic echo canceling cards currently offering 807 combinations.

In Sydney's 19A, each array has 8 drivers. Each zone has two arrays, with drivers 1 to 8 in the left array being paired with the corresponding driver in the right array. With three zones, a total of 24 outputs are therefore provided by the Audia, each with its individual signal processing.

what we needed in terms of acoustical treatment, loudspeakers and electronic hardware and software technology. The arrays are designed with our in-house software, and the parameters are then dialed up on site. Then using a very detailed acoustic measurement and listening process, we set up the crossovers, eqs and delays."

Audia has an automatic mixer which Leembruggen and crew helped refine. "We gave BIAMP a lot of input on the performance we were looking for," he declares, "and BIAMP combined that with their extensive knowledge and have come up with a very good one that is now our benchmark. That's important in Courts because with this operation we have to have absolute control over mics being on or off. The automixer is very responsive and very solid in its recognition of the 'true' mic that is to be activated."

All of which makes it cost effective as it saves on extra equipment and provides operational efficiency, is clean and tamperproof, and is a very finely balanced machine. On the acoustic treatment side, the reverb time was too long so they put up wall mounted acoustic panels provided by Shamrock Industries.

All this in the name of justice. Whether it takes acoustic panels or the most sophisticated digital audio networking technology, the court continues its tradition, begun more than 100 years ago, of doing whatever it takes to make the wheels of justice spin ever onward. And sound good doing it. How does it sound? Leembruggen says "It has met our design goals and we like it very much. Intelligibility is great, lots of gain before feedback, and it sounds very natural and comfortable. Better still, the High Court of Australia is extremely pleased." ◀



Inside the High Court of Australia in Canberra, Australia.

Biamp Systems is an acknowledged international leader in the field of professional audio electronics. The company is recognized for delivering innovative and high quality electronic products, including the Audia, Digital Audio Platform, to meet the audio requirements of corporate boardrooms, conference centers, theater complexes, stadiums, transportation, Houses of Worship, educational centers and other installed audio applications.

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