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Column inches

The new generation of column arrays could advance the cause of immersive sound, writes Phil Ward . . .

[UK] Arguably, the contribution of immersive audio to the evolution of sound reinforcement is stunningly basic. This industry got into its stride when abnormally amplified music began to smack people in the face. Naturally its machinations soon became part of the fabric of touring and, eventually, the hidden charm of posh concerts. At the same time, everyday folk who need to be heard above the crowd gained an armoury of speaking aids for every occasion, and the shouting was over.

Immersive techniques can be applied to every single one of these requirements; loud, not loud, somewhere in between. It is a new dawn for the business of addressing the public, *en masse* or *o sole mio* with headphones. However, the story has to this point been told by line array and point source, as the scalability of the various formats has been demonstrated from stadium to studio. But let's not forget that between these formats is a breed of loudspeaker called the cardioid column, a breed that, with some irony, provided the very first examples of musical heavy lifting courtesy of Charlie Watkins and his WEM column - 50 years on, it's a product category going through a networked renaissance, with huge potential for 3D sound in myriad mid-range applications.

REWRITING THE RULES

Among the best examples at the moment are d&b audiotechnik's Soundscape solutions for the typically reverberant houses of worship market - especially Sapphire Sound in Canada, which has used a DS100 signal processing engine at the First Assembly Church in Calgary. This is a deployment of d&b's xC-Series of column loudspeakers that, in the words of Sapphire's Ben Burrell, "reduced the number of cabinets required and consequently reduced the amp count." The key to it is



Soundscape's object positioning tool, within the En-Scene module, to overcome all of the conventional point-and fire acoustic headaches of such a space. "This is a whole new way of giving people what they need and a new way of thinking about the headroom and how it's shared," comments Asher Dowson, d&b's house of worship segment manager. "With Soundscape, dispersion is so well-controlled, you don't have to worry about the back walls."

These particular speakers are cardioid columns that are mechanically-steerable in the HF, but not as yet beam-steerable by digital means. They have 18dB of rejection down to 200Hz, with the 24C-E extension module, while the pattern is fully-controllable throughout a dispersion angle of 90°. "This is enough to get speech resonating with meaning and not just sounding like information, billowing out from the back and causing additional early reflections," continues Dowson. "There's a limit to how far you can 'immerse' someone who's 1,000ft away from a 180° configuration. You're only covering about 2% of their peripheral hearing - 'immersing' across the bridge of their nose!"

The First Assembly Church

has just 650 seats, not the 3,000-5,000 capacities of the famous mega-churches. Its under-balcony is very deep, and yet the specification demanded a very ambitious "stereo for every seat". Significantly, the brief was met using exclusively xC-Series column speakers, in conjunction with the immersive signal processing.

It's an application that rewrites the rules about how an immersive audio system can be used. If it was a line array being used to reach that far into the deep recesses of the hall, all the energy would be coming from two separate HF enclosures. But if the column array's five HF devices are dispersing a time-relative wavefront, it distributes the headroom among them as well as widening the area of spatialisation. Effectively, it's achieved by the co-ordinated alignment of several point sources.

ADJUSTABILITY

The latest generation of high-end column arrays only encourages this perception, with a new theme developing: unprecedented attention to HF and MF adjustability in close proximity. Whilst already four years old, L-Acoustics' Syva



packages its six 5" MF cone drivers and three 1.75" HF diaphragm compression drivers into a 'HF sandwich': called a colinear source, the HF is in a middle section that copies the J-curve of full-blown line array and is said to result in a long throw complemented by front down-fill.

"An immersive experience is about enveloping people in music, words or effects," comments Germain Simon, head of product and technology marketing at L-Acoustics. "To obtain this experience, a speaker needs to have a very wide coverage with stable off-axis response, so that anyone in the venue will hear what's coming from the speaker, whether we're addressing the main scene system or surround systems. Control of the energy is important as well. We want to make sure that the room acoustics do not mask the direct sound, and that what's aimed at the audience is not polluted by the excitation of the room."

Importantly for many musical and experiential applications, Simon points out, the discreet integration of the speaker with its location is crucial to remove technical cues and leave the audience 'magically' enveloped by sound. "Syva offers all that," he adds. "It offers very high and accurate SPLs over a wide horizontal coverage of 140°. Thanks to colinear source technology,

"The story has to this point been told by line array and point source, but let's not forget that between these formats is a breed of loudspeaker called the cardioid column ..."

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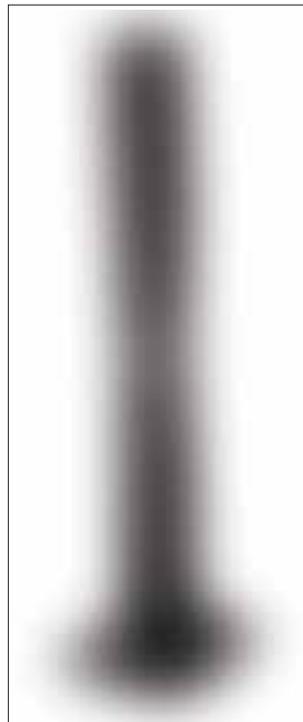
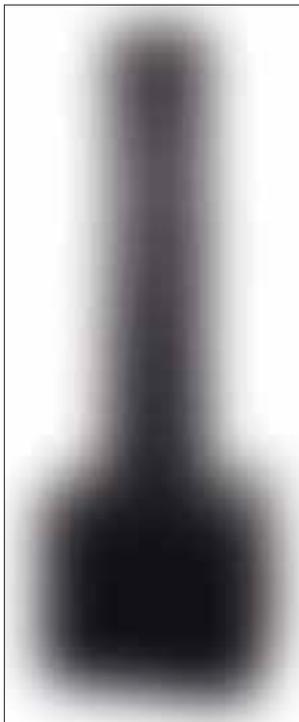
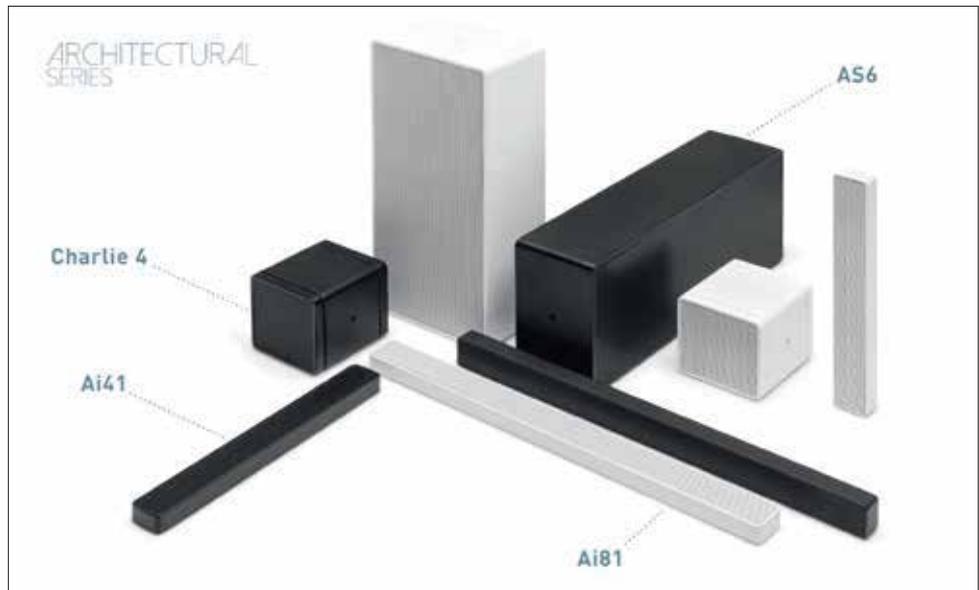
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➔ Outline's new Architectural Series



“All these characteristics, in all of these models, seem almost optimised for the delicate work of threading object-based audio around challenging spaces . . .”

dispersion of energy in the vertical domain is kept under tight control. And finally, with its unique, streamlined and elegant form, in any colour, Syva blends acoustic performance and art into any venue.”

More control is provided by the addition of a so-called Acoustic Source Multiplier waveguide to the renowned ICLive X Series by Renkus-Heinz, which mounts the HF section coaxially in front of the LF section. Being co-ax, there entails a full-frequency throw from every point along the array, making the function of acoustic focal point entirely switchable. As well as this, the spacing between each driver combo is very small, increasing HF clarity.

All of which is road-tested and proven at The Aquarium of the Pacific in Long Beach, California. A new exhibition entitled *Pacific Visions* is a showcase of immersive multimedia, but the audio is handled by 29 ICLive X enclosures installed, along with everything else, by LA-based Edwards Technologies. It’s “the future of both the AV industry and of storytelling as a whole,” according to company founder Brian Edwards, who emphasises the flexibility and scalability of the digitally steerable arrays, configurable up to 12 cabinets high and using Renkus-Heinz’s RHAON II network-agnostic software control.

Meanwhile, Nexo claims that its new ID84 is as good for music as it is for speech, not least because the HF uses dome

tweeters rather than compression drivers and is able to switch HF dispersion in the vertical plane between ‘narrow’ and ‘wide’ output. Outline’s new Architectural Series includes the mid-high modules Ai41 and Ai81 with an MTM arrangement similar to the basic concept behind Syva: midrange drivers above and below the HF, a configuration acknowledged as useful in the fight against lobing. Again, these are passive speakers meaning a saving on amplifier channels and, naturally enough, Outline recommends its own L3000 compact power amplifier with DSP. Finally, DAS Audio has added the Q-83T to its Quantum range, sporting eight 3” neodymium drivers and a dispersion pattern of 120° by 20°.

This radiation pattern, DAS Audio says, “minimises the reverberation produced, improving intelligibility in complex areas.” A simple boast, but we can see that all these characteristics, in all of these models, seem almost optimised for the delicate work of threading object-based audio around challenging spaces. Yes, there are new costs. But the cost impact of the signal processing engine, and any software licences, can be offset against a net reduction in separate speaker enclosures and associated amplification, in most cases where a high speaker-amp payload would be necessary anyway.

And, in any case, what price a place in the sound reinforcement revolution? |