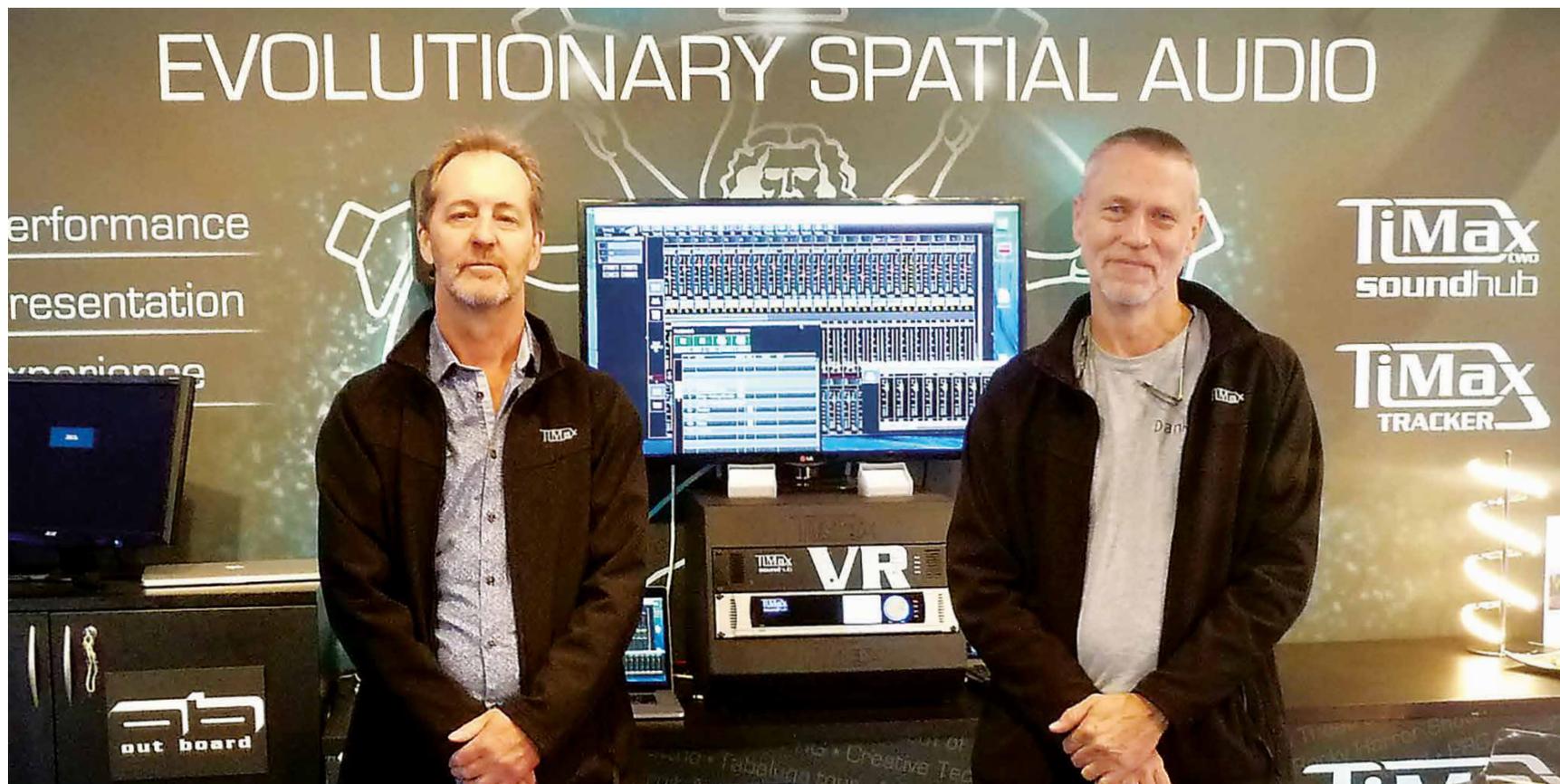


# Spatial awareness

In a time of renewed popularity, **Simon Luckhurst** discusses spatial audio developments with the Out Board duo responsible for quietly and consistently pushing the market forward



L-R: Dave Haydon and Robin Whittaker



Even Mozart was given an immersive update in Shanghai with the help of TiMax



Ctrl Fre@k called on Out Board to create an immersive soundscape for the Bicentennial Experience at Singapore's Fort Canning

**SPATIAL AUDIO IS ALL THE RAGE RIGHT NOW, BUT THIS** wasn't always the case. Surround sound systems have frequented people's living rooms for more than a decade but how many people ever used them to listen to music in surround sound? It's a weird dichotomy – people have been content with stereo sound for far too long.

But not everyone. For Out Board's original founder, Robin Whittaker, it was more than three decades ago when he had a realisation of the importance of spatial sound. 'It was at a show in the West End; the second act started with a performance from a couple doing a duet behind a closed curtain,' recalls Whittaker. 'When the curtain flew open, they weren't where my ears told me they were going to be – they were on the opposite side of the stage. It was one of those moments of absolute disparity.'

Out Board as a company had already been in existence for some time, but its focus on spatial audio was still a way off. 'I'd proved that I was fairly unemployable, so the only option for me was to start my own business,' Whittaker adds. 'I met this mad Pole called Wladyslaw Wagnanski and we had an idea to develop a moving fader automation system for the live event business. It was the fairly early days of fader automation, with people like Flying Faders and Massenburg pretty much owning the studio business. Myself and Wladyslaw thought, you know, live sound, there's a place for this.'

The show Whittaker refers to involved a helicopter moving around the room at the Royal Drury Lane Theatre. With a background in retrofitting show automation systems to audio consoles, the problem fell into Whittaker's lap. 'I happened to come into contact with Andrew Bruce, the original founder of [theatrical sound company] Autograph, who was trying to solve this problem of audio following the helicopter around the theatre,' he recalls. 'He says, if you can produce a box that'll do it, then I'll buy it for *Miss Saigon*.'

Whittaker went on to develop that product – 'a little box with knobs on it that would learn what you did,' he says – and progressed to retrofitting its moving fader elements into Soundcraft, Amek and Midas consoles. Then came a kind of Eureka moment. 'Putting two and two together, it became pretty obvious that if you don't control the time domain in a distributed sound reinforcement system, you will never be able to control direction. And that meant we needed to go fully digital in the signal processing.'

But this was the late 1990s and digital processing was rudimentary at best. Practically no one that he was aware of except himself and his colleagues were paying the topic any attention. 'We were totally unaware of any work that had gone before, so we set about developing this delay matrix thinking that it was a completely unique idea. We got a government Smart award to help with the R&D, developed the first prototype and took it to the PLASA show. Lots of people came around and said, "What's that for? Why would you want to do that?"'

It was around this time that Whittaker's business partner, and the other half of Out Board, came into the picture.

'I'd been at BSS Audio for about 12 years,' says Dave Haydon. 'I was working on the Millennium Dome in 1999 and Robin was also working on it but, even before that, I'd thought what he's doing was really interesting. It was different to the compressors, gates, crossovers and equalisers I'd worked with that subsequently evolved onto the BSS Soundweb generic DSP platform. So, I got into what Robin was up to. Although I hadn't had much of a clue what he was talking about when we first met, I became a partner in early 2000.'

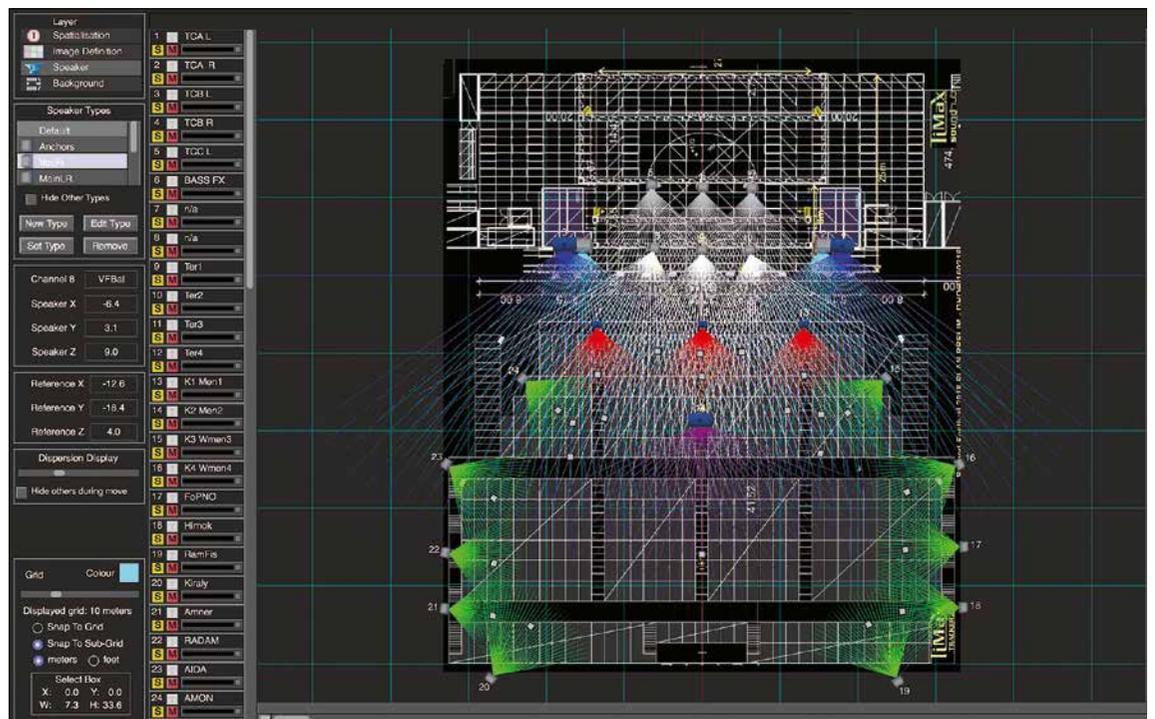
Following the upheavals of 9/11, the company was restructured and relaunched in late 2001 with Whittaker and Haydon at the helm as 50/50 partners. It was a couple of years prior to this that TiMax, a product that has since revolutionised the spatial audio market, first came onto the scene in its original guise.

'One of the big proponents and one of the key shows that got revolutionised by this was the Albert Hall operas staged in-the-round every year by Raymond Gubbay,' says Haydon. 'It turns out that they'd been doing it for nine years with a conventional PA centre cluster. TiMax went in and they exploded this cluster and spread it out around the hall. It became the norm from that point on.'

'TiMax was driving all these speakers independently with separate outputs. The stage became divided into 20 zones and the matrix delays were managed in real time as people moved around the stage,' adds Whittaker. 'The localisation and resulting audience engagement this achieved revolutionised the show.'

TiMax evolved a step further with the introduction of a tracking system in 2008. 'Prior to this, you had to cue the show manually anytime anybody moves,' Haydon explains. 'These cues would be plotted in rehearsal, there would be 100-120 cues and whenever one person moved the engineer had to remember it all. Half their brain would be focused on that at the same time as trying to mix a 60-piece orchestra and 15 actors onstage. What took a quantum step beyond that was the introduction of our TiMax Tracker performer tracking system.'

Following an early and partly successful foray with OEM'ing a European 2.4GHz tracking platform, the pair found a more ideal core technology that already existed local to them in Cambridge in the UK, developed for industrial applications. 'Airbus, Aston Martin, DeWALT tools, people like this, were already tracking



**Spatial rendering with TiMax PanSpace**

'The SoundHub was blowing people's minds,' adds Whittaker. 'People were still putting a vocal system and music system on either side of the proscenium and assuming that that was all right. But TiMax SoundHub came along and it allowed us to hit different price points with a lower entry level and enabled us to spread our product out across more markets.'

TiMax SoundHub would go on to enjoy unbelievable success in the theatre market, as well as opening the company up to all-new sectors such as theme parks, museums and anything requiring spatial audio combined with automated show control.



**TiMax TrackerD4 kept everything in sync during the Royal Edinburgh Military Tattoo at Sydney's ANZ Stadium**

'We were then able to address not just the performance market but what we call the presentation market, corporate events and retail,' says Haydon. 'Then there's the experiential market, which is one that's been growing rapidly more recently. We're now used in museums, theme parks, even ride-cars, art galleries, expos, all these kinds of businesses.'

The Military Tattoo business, specifically, is one that Out Board has been very active in for many years. 'Some of the very earliest shows that TiMax ever did were tattoos, because of the problem of extremely large outdoor arenas and the disparity in musical timing, particularly between loud acoustic instruments and the amplified result,' explains Whittaker. 'You have to be continuously varying delays to speakers in order to keep the particularly bangy instruments in time with what's coming out of the loudspeaker wherever you're sitting. I think it's generally accepted that you just can't do a show like that without TiMax.'

These days, Whittaker and Haydon are not pursuing developments in spatial sound alone. Several of the large

sound reinforcement manufacturers have thrown their weight and, crucially, resources, into the mix.

'There are aspects of this that are of course frustrating and amusing,' shares Whittaker. 'For example, the countless discussions that we've had over the years with some sound designers, where we would say, "what you need to do is to rethink how you deploy your loudspeakers", and they would answer, "we can't possibly do that". In this respect, the other manufacturers have done a huge service to us in showing sound designers what you can actually do with these systems if there's a will. And, certainly, their multimillion-euro marketing budgets have done us no harm. Some of these companies have been doing great work in expanding the market and the knowledge base in a way that our resources couldn't possibly.'

Unbelievably, as Out Board's only two permanent staff members, everything the company has achieved is largely the work of Whittaker and Haydon, albeit with the aid of many more 'virtual' staff. It's a model that has paid the company dividends, particularly in the current times of forced lockdowns and remote working. 'We run sort of an interesting business model called a virtual corporation,' explains Haydon. 'There are lots of people involved in the development and manufacture of the product that don't directly work for us, but there's a profit share motive behind it all. It's an interesting model and it's worked very well for us since 2001.'

With 3D immersive audio undergoing somewhat of a renaissance at the moment, there is certainly no desire at Out Board for TiMax to rest on its laurels in the face of new competition. In fact, the company has a few new surprises up its sleeve. 'We have a very ambitious R&D programme going on at the moment and we're developing some really interesting reverberation techniques and technology. We're pushing hard to be ready later this year with 96k, which has been a complex journey because of the challenges of getting in and out of a piece of equipment with more than 64 channels of 96k audio cost-effectively.'

'We have actually also got quite a long way down the line with evaluating lighting and video control with our all-new TiMax TrackerD4 system,' shares Haydon. 'Although the commercialisation of that is early days yet, we think it's going to be quite a landmark for us to diverge into lighting and media control, with or without associated spatial audio management.'

One of Out Board's biggest early achievements was the advances it's made in immersive spatial audio but, in truth, it is its highly evolved integration with diverse show control capabilities that sets TiMax apart from the rest. Now set to move outside the bounds of sound, the field looks wide open for even greater expansion.

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**Stage and object-based tracking for Cats, held at Switzerland's Thunerseespiele in 2017, was handled with TiMax SoundHub**

cars on a production line and tracking tools and pallets in warehouses,' says Haydon. 'We discovered that the platform was actually ideal for us.'

When they first deployed it at the Royal Albert Hall alongside TiMax in 2008, the audio engineer working on the show considered the new solution as the 'Holy Grail', allowing him to focus on what he was really there for. 'The tracking system became kind of a ground-breaking development,' notes Whittaker.

With technology advancing rapidly through the early 2000s and digital signal processing offering greater possibilities, the next iteration of TiMax, the TiMax SoundHub, hit the market in 2010. 'We kind of morphed it into a complete product over a period of time,' says Haydon. 'It had many more channels and a lot more facilities. It had 64 tracks of playback, EQ and everything that you'd normally have to pay extra for. We were able to tick more boxes in the spec and justify our place in the budget a lot more.'



**TiMax immersive audio with VivaVision, the largest 4K video screen in the world, launched at Las Vegas Fremont Street's New Year's Eve party**