



The Naha Cultural Arts Theatre on the island of Okinawa, Japan, features GEO M10 line arrays with MSUB15 subs flown LCR above the stage with additional L-R clusters and ID24s as under-balcony auxiliary speakers

# Redefining theatre sound technology

Advances in theatre sound technology could be key to providing more memorable experiences for performers and audience alike. Head of NEXO Engineering Support **François Deffarges** explains

**To succeed in an increasingly competitive environment**, theatres and performing arts venues will have to attract audiences with value-added experiences they simply can't get at home, while providing an inspiring and versatile performance space to a range of productions that can vary dramatically from week to week, or even from one day to the next.

As the physical layout of the typical theatre space remains largely unchanged with a stage at the front facing tiered seating, it's perhaps developments in audio technology that present creatives and venue operators with the best opportunity to engage with audiences on a deeper level, ultimately helping to redefine what might be expected from "a night at the theatre".

"Immersive audio technologies provide sound and production designers with new opportunities to enhance the drama and draw the audience into the story-telling," says Deffarges. "With Yamaha AFC Enhance, venues can transform the acoustics of the space, delivering an optimal sonic environment for every type of production. And AFC Image enables the manipulation and placement of sound sources in that space, revolutionising the way that audiences experience a production, for instance with sound that tracks the location of actors."

"Theatres also have an opportunity to share productions with a much wider audience



**P+ Series speakers have been deployed at the historic Swansea Grand Theatre in South Wales, with ID24s used as stage front fills and under balconies**

through streaming and can enhance the intimacy of the performance for remote viewers by broadcasting in popular surround sound formats."

As part of the Yamaha Group, NEXO is responsible for the role of "reproduction" in a team of brands that also encompasses sound creation, control and delivery, providing one seamless workflow from pre-production to the opening night.

"With NEXO NS-1, system designers have access to a powerful and intuitive system

source speakers to the GEO M Series of three compact line arrays of consistent sonic signature – M6, M10 and M12. Typically characterised by high output from a compact cabinet, NEXO speakers harness a number of patented technologies, including the Hyperbolic Reflector Waveguide which converts the spherical wavefront generated by a high-frequency compression driver into a flat or convex wavefront using an acoustic reflector, allowing speaker cabinet acoustical coupling without interference up to 20kHz.



**The NS-1 includes AFC Design Assistant which provides the necessary guidelines for the required type, number and placement of speakers to provide fully immersive audio**

design and simulation tool that supports all NEXO speakers and powered processors," continues Deffarges. "Working closely with Yamaha AFC Image, it includes AFC Design Assistant which provides the necessary guidelines for the required type, number and placement of speakers to provide a full immersive audio experience for the entire audience."

NEXO's product offering in the theatre sound sector ranges from P+ Series point



**GEO M10 cabinets match the décor at the 125-year-old Stadsgehoorzaal theatre in Kampen, the Netherlands**

The company's ID24 speaker, with its rotatable horn and twin 4-inch drivers mounted in a V-formation, has quickly gained a global reputation as an easily deployable solution for the precision beaming of sound into difficult spaces, particularly under balconies.

"We're already seeing the trend away from left and right line array hangs and speakers mounted on the proscenium arch to a higher quantity of smaller point source speakers or small clusters distributed throughout the auditorium – and that's not just to deliver immersive sound productions," says Deffarges. "Achieving a more consistent coverage of high-quality sound enables sound pressure levels to be reduced, while increasing dialogue legibility to allow enhanced expression of nuance and emotion in the performance. This also has the added benefit of helping venues to comply with licensing regulations."

Also important in the design of a theatre sound system is the availability of a scalable and networkable power and processing solution. NEXO NXAMPs combine four-channel amplification with linear phase processing presets for all NEXO cabinets, making it easy to configure complex systems combining speakers from different ranges, for instance clusters of GEO M Series line array elements and partner subs at the front, ID24s as front fills and under balconies, and P+ Series around the auditorium.

Based at a purpose-built design and manufacturing campus in Plailly, some 40km to the northeast of Paris, Deffarges and the NEXO Engineering Support Team provide technical services and system design assistance to



**NXAMPk2 powered controllers deliver a "plug-and-play" combined amplification and processing solution for all NEXO systems**

a global network of NEXO distributors and installers, typically getting involved with system configuration and the prediction of performance at the project tender stage using NS-1 software, then again for onsite tuning at the commissioning of the system when installed.

"Topping the list of requirements in theatre sound system design are achieving consistent frequency range and SPL coverage throughout the venue and locating the speakers at the points necessary to articulate the location of sources consistent with the sound design of the production," continues Deffarges. "However, there are plenty of other factors to consider."

"Installing a system of sufficient power to handle everything from stand-up comedy to live music makes venues much more versatile. It's also important that the system doesn't obscure sight lines from any seats in the house, and that the cabinets are specified in the correct custom colour to fit in seamlessly with the design of the building, particularly in historic buildings."

"Most excitingly, audio technology is evolving in a way that brings performers and the audience closer together, heightening the drama, sharing the emotions, telling the story. Ultimately, a theatre sound system is successful when the audience doesn't even know that it's there."