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Interviews

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Features

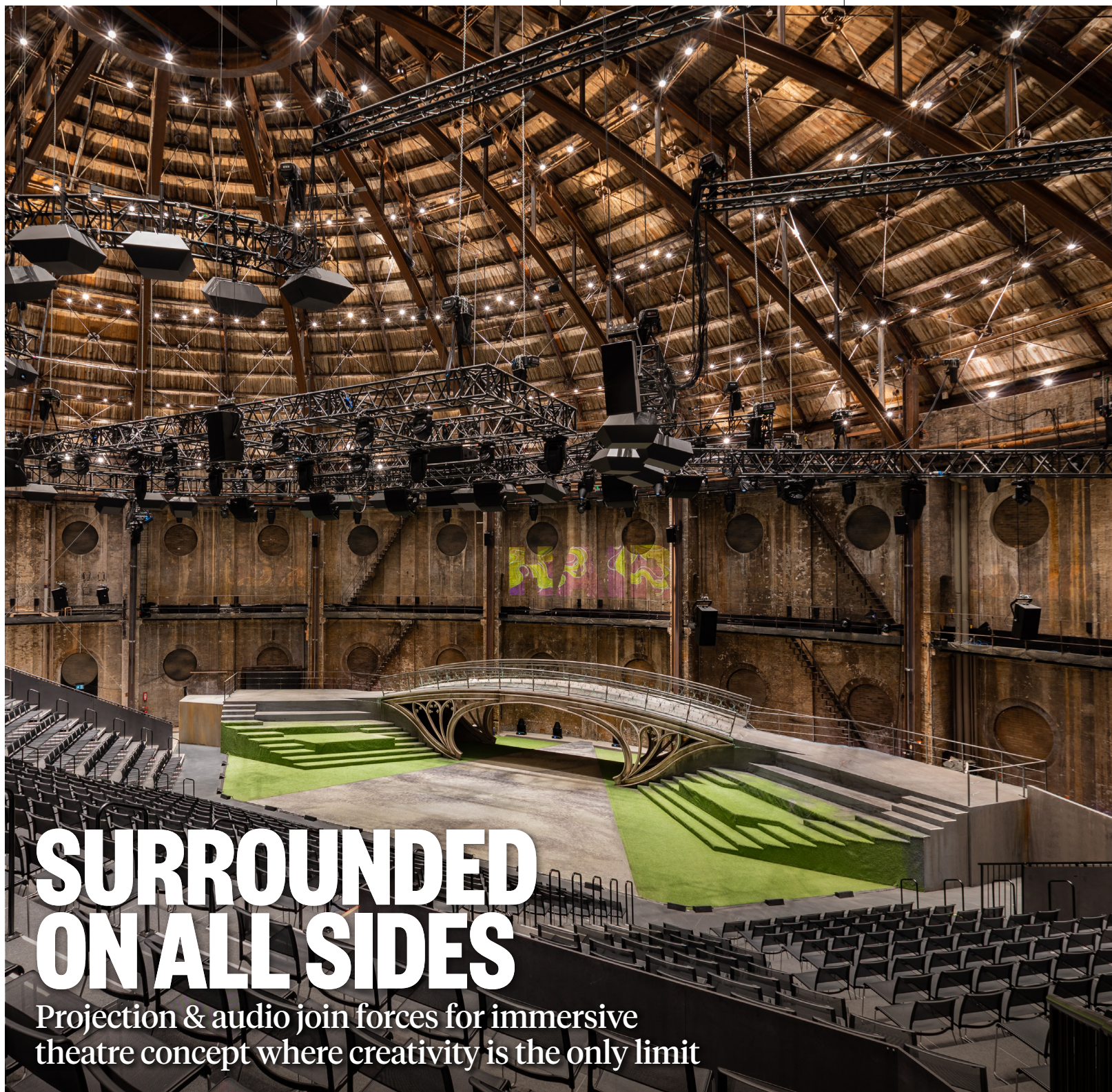
Projection makes a surprise return to the meeting room thanks to Microsoft

Technology

Beaming into a boardroom near you; are 'holograms' for business the future or a fad?

Case Studies

A major, mid-pandemic upgrade to an events venue is a sign of the times



SURROUNDED ON ALL SIDES

Projection & audio join forces for immersive theatre concept where creativity is the only limit



ALL ROUND SUCCESS

Faced with a challenging venue for performances, artistic director **Soren Moller** supported by a team of specialised technicians created a vision to work with the unique space, rather than fight it. **Anna Mitchell** discovers the astounding results.

The biggest obstacles spark the most creative solutions,' says Soren Moller, artistic director and creative producer at GasOmeter Copenhagen (Østre Gasværk Teater).

Moller's most pressing challenge when he took up his role at this extraordinary venue was an acoustic one. As its name suggests, the Østre Gasværk Teater resides within a converted gas holder. A brick walled, circular venue with a curved, wooden ceiling and absolutely packed with hard surfaces; the theatre is an incredible space, but from a production perspective was difficult to work in.

"Disruptive reflections were our main problem," continues Moller. "Our former line array set up had arrays hung from rigging in the roof and the sound was literally bouncing off the ceiling." The set up was also disruptive to sight lines with the hangs of arrays breaking the audience's view of the unique architectural interior of the gas

holder, a key feature of this venue.

While there were pressing challenges to overcome, Moller's vision went beyond just fixing acoustic issues and sight lines. He wanted to take the opportunity of a technical upgrade to push the very boundaries of theatre and performance. "This venue literally surrounds the audience; it calls for immersive technology," says Moller. "We wanted to turn it into one big canvas visually and audibly."

The plans were so ambitious in the way that they would change how theatre could be experienced that Moller coined the term TheatreMax® to concisely convey the entire technology set up in language that is consistent with other entertainment concepts that provide huge immersive canvasses such as iMax cinemas.

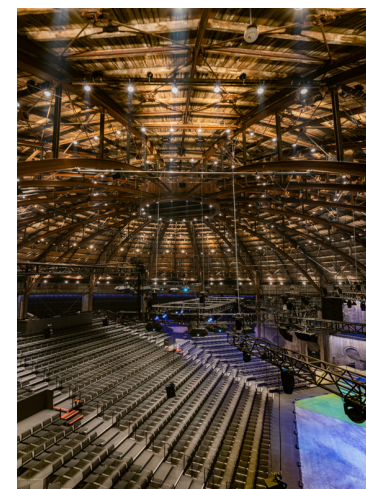
Apart from his vision, one of Moller's key assets was a network of contacts built up over years of working in theatres and production, and a background that spans performance as well as management and directorial roles.

The first partners Moller started working with on the idea to develop the theatre were integration and consultancy firm Stouenborg, integrator and d&b audiotechnik distributor Alfa Audio and then later the rigging company Drop.

Expanded canvas

"Visually we wanted to change the building without putting a canvas in front of it," says Moller. The natural choice to do that was projection. Stouenborg introduced Panasonic to the project who immediately also saw the huge potential to add visual highlights to the interior brick walls and domed wooden ceiling, enveloping the audience in content.

The display technology manufacturer led by Felix Kleisen, sales engineer at Panasonic, joined forces with Stouenborg to set about designing an indoor projection mapping system. Anders Jørgensen, project manager and consultant at Stouenborg, says: "Panasonic were excited by this project from the start and Felix came up with the initial design for



the projection mapping system.”

Using Kleisen’s initial design Stouenborg employed an IFC model (an open file format used by BIM programs) to work out where to hang the projectors within a 3D space. “We used our VR system to help us see where the projectors would hang and optimise their positioning so they did not light up objects such as scenography, light fixtures and speakers,” adds Jørgensen. “The 3D model viewed using VR glasses was a vital tool to help us calculate the complete installation with our installation team.”

The installation also had to be completed in a compressed time frame; Stouenborg and Panasonic had to design the entire system off site and have it ready to install in a very small window of time. Being able to visualise the installation in a 3D space using VR was essential to meet the time pressures, allowing optimum positioning to be achieved before the units even got on site. “We were able to fly everything within five days once the trusses were ready,” says Jørgensen.

Stouenborg installed 25

Panasonic PT-RZ120 projectors to deliver a projection system capable of 11K content. Content is served from two disguise d3 4x4pro media servers with four 4K outputs, each of which is split using Vivolink HDMI splitters and sent over fibre to four projectors.

Opting for Lightware for signal extension, Stouenborg installed HDMI20-OPTJ-TX90 transmitters and HDMI20-OPTJ-RX90 receivers. The integrator also selected Netgear managed switches to manage the network traffic for the projection system.

As the set up was inside and the theatre was in full control of the lighting, projection could be very effective. “The grey, sandy brickwork colour also lent itself to being a colour canvas very suited to laser projection,” says Moller and adds: “Projection has been used in theatre for decades, but to have your entire vision covered... that’s a huge asset. It also allows us to do scene changes in a heartbeat.”

The powerful system offers huge scope for the future and is already

delivering stunning visuals for the first show running at the venue with 1TB of immersive graphics that bathe the walls and ceiling of the venue in engaging animations.

Surrounded in sound

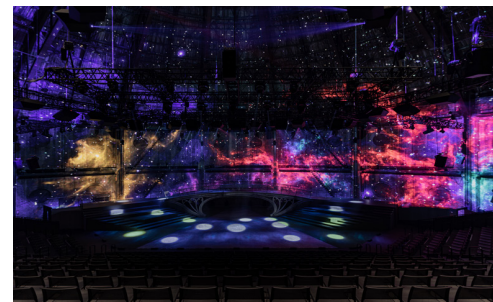
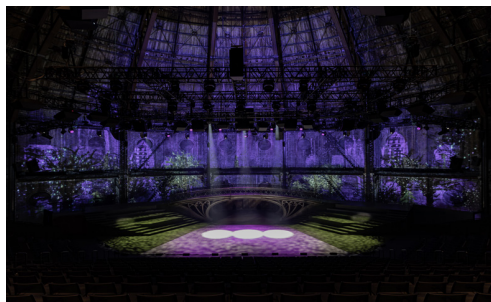
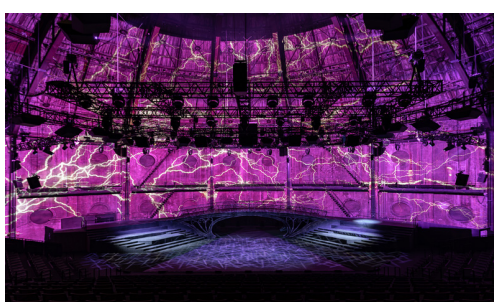
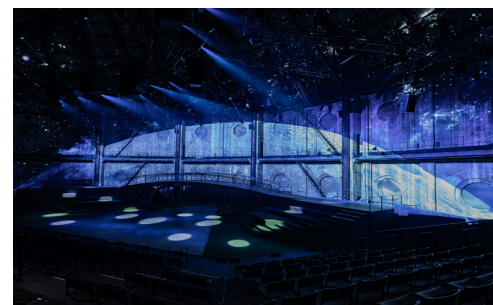
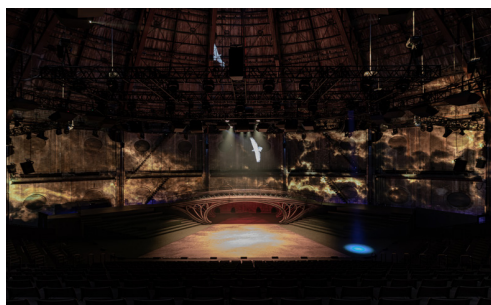
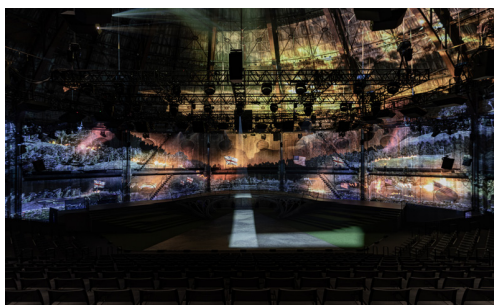
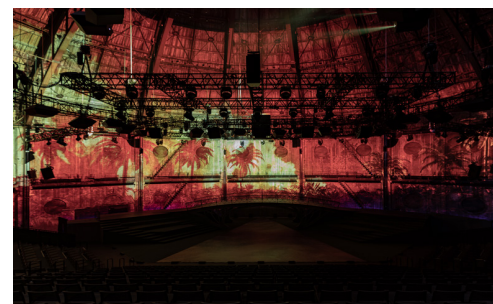
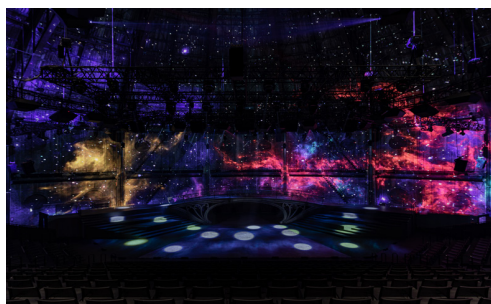
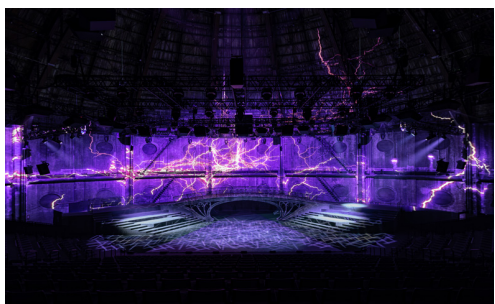
Lars Baun Frederiksen, managing director of Alfa Audio, says: “About a year ago Soren called me and said he had a crazy idea.” The excitement was infectious and Frederiksen quickly started thinking of what d&b audiotechnik’s immersive, object-based sound system Soundscape could do in the space.

Before any technical installation, the theatre worked with acoustic fabric company KulturHåndværket to install 1,200 sq m of acoustic dampening treatment at the venue and a large bass-trap installation beneath the audience. Frederiksen then brought Steve Jones, head of education and application support (EMEA) at d&b audiotechnik, on site.

Jones says: “The minute I walked in, I was captivated by the venue. And then I met Soren who

We can move sound anywhere now: above people’s heads, have it come directly from performers or other visuals. With subwoofers installed under the seating we can even create a rumbling from below.

Lars Baun Frederiksen, Alfa Audio



The projection system gives the venue power to use the fabric of the building as a creative canvas

spoke of stories and storytelling and wanting to enchant the audience, but with a clear understanding of the role of technology. His excitement was infectious.”

Fresh from working on sound system design for London’s Royal Albert Hall and Wembley Stadium, Jones immediately drew parallels between the spaces. “This was another round venue, and round venues are tricky; you can’t measure anything, everything is curved, you don’t know where your references are,” says Jones. “But I just find something intriguing about round rooms. Also, GasOmeter Copenhagen reminded me of the Royal Albert Hall; you can almost feel the stories in the brick.”

Jones joined Frederiksen and Frodi Vestergaard Dam from Alfa Audio, as well as Christian Knoll from d&b audiotechnik to design and install a Soundscape system.

Two DS100 64 x 64 matrix processors power the Soundscape installation and run both En-Scene and En-Space software so the system can be used for object-based signal management and to emulate different environments

with varying reverberation times.

Alfa Audio installed 23 d&b AL90 augmented array loudspeakers in nine arrays in the front of the venue. Three SL-Subs were flown behind the central AL90 cluster. Fifteen 44S units were used for frontfill, while 12 Yi10Ps acted as delays. A further 16 Yi10P delivered 360-degree surround sound. Thirty-two 8S loudspeakers were used in the ceiling. Six 21S-Subs were installed under the tiered seating to deliver sound effects.

Powering the system are two D80, nine 40D, eight 10D and eight 5D amplifiers. Each amplifier has four channels with dedicated processors for the d&b loudspeaker and DSP filters for tuning the system. Network based signal distribution is managed by Luminex 30i switches.

“We can move sound anywhere now: above people’s heads, have it come directly from performers or other visuals. With subwoofers installed under the seating we can even create a rumbling from below,” says Frederiksen. “And you get the same experience wherever you are seated.”

A TTA Stagetracker II RF tracking system had been installed before the Soundscape installation and Moller adds: “Now we can track all the performers. Soundscape processes where they are in the space and the audio will come from them. The stage is so wide the sound localisation is required to pull attention. When you add to that the fact the video system creates a vast canvas across the curved walls and ceiling, the audio becomes a crucial tool in drawing the audiences’ attention to action. We are going to integrate the TTA Stagetracker with the projection system as well for the next performance.”

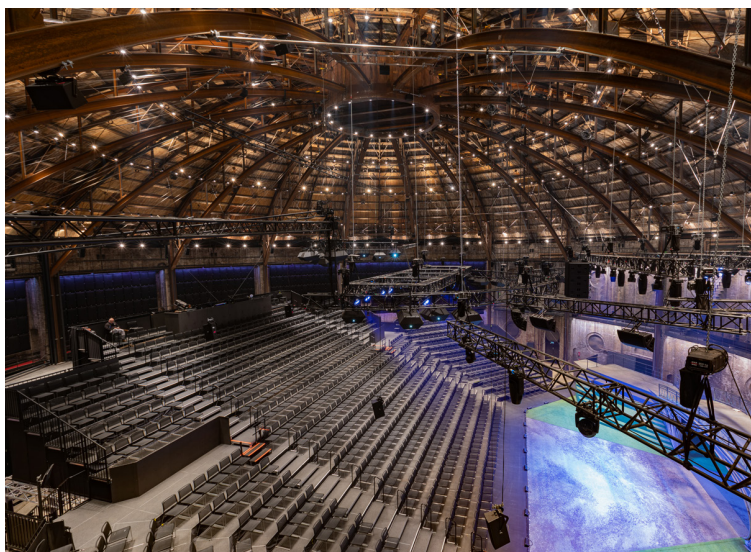
A new dimension of storytelling

“You want the focus to be on storytelling,” says Moller. “Everything plays its part; no single element is effective on its own. Lighting, sound, projection all have a role in us being able to control the focus of the audience.”

To allow the focus to be on storytelling, the technology must be unobtrusive, and this drove many of the decisions in product and system selection. The d&b

Projection has been used in theatre for decades, but to have your entire vision covered... that’s a huge asset. It also allows us to do scene changes in a heartbeat.

Soren Moller, Østre Gasværk Teater



audiotechnik Soundscape system meant small, scattered speaker arrays integrated into a single system could effectively replace longer line arrays.

“The whole point of Soundscape is to make the speakers disappear,” adds Jones. “I don’t want the audience to notice they’re listening to a speaker. If they notice a speaker and they look at it in any point in a show, for me that’s a failure. The goal is for audiences to get lost in the story and the technology to disappear.”

Meanwhile the projectors needed to deliver the resolution and power required in a small footprint and, most importantly, without introducing unwanted noise.

When the options were considered, it soon became apparent that it would be impossible to have 25 projectors of the power required installed within the space and keep the noise within tolerable levels. Fortunately, Stouenborg had some tricks up its sleeve and designed custom-made housing for each projector. Now, installed within sleek black boxes the projector noise is barely audible and a clever ventilation system ensures they don’t overheat.

“I’m not overstating anything when I say this solution from Stouenborg was absolutely essential to the success of the project,” says Moller. “If the projectors had been making the noise they would have without this housing, the audience would have been distracted from the performance and become aware

of the technology powering the immersive experience.”

It wasn’t the only custom element Stouenborg brought to the project. “The projectors had to be mounted at 45-degree angles and there simply wasn’t a bracket that would do this on the market,” says Jørgensen. “We designed and made one to achieve the rigging we required.”

All hands on deck

What’s truly astonishing about this project is the timescale in which the system was delivered. Moller had to convey a vision to partners that could help him realise it. But until the team knew what was required, how much it would cost and importantly what the new system could achieve, they couldn’t start on working to get the funding secured to pay for it. At the same time, Hair, the first show to run with the TheatreMax® system, was scheduled before the team knew if the funding would come through.

Again, partnership played a huge role in this project’s success. Moller had to sell the vision to several charitable foundations and convey the benefits the investment would bring. To do that he had to have the buy in of the team he’d curated before anyone was even sure the installation would go ahead.

The dreams of the team working on the project were compelling and Moller successfully secured the investment required from the A.P. Møller Fonden, Augustinus Fonden and Aage og Johanne Louis-Hansens Fond. “Beckett Fonden also sponsored a new Digico Quantum 7 T which was

needed to take full advantage of the new sound and tracking system,” adds Moller.

With the green light to go ahead with the installation, kit was ordered in October 2022, Drop installed all the rigging over Christmas 2022, the installation finished in January 2023 and Hair began its run at the end of February 2023. When Hair finishes a theatrical rendition of Another Brick in The Wall, Part V will start at the theatre.

The opportunities are endless for the range of performances that can be accommodated: from theatre to musical concerts, art exhibitions and even corporate events. Each user is likely to apply the system in different ways and will contribute to the evolution of a concept that is already pushing boundaries.

“This is the first venue I’ve worked in that we’ve managed to create true object-based audio in the ceiling,” says Jones, adding: “We’ve put equipment in that we still don’t know how it will be used. We believe we’ll be able to answer certain questions in the future that we can’t now, and the system is there, ready to go when we get there.”

This is a project that will have a huge impact and Moller certainly sees it as helping to “push the theatre concept forward”. As much as TheatreMax® will undoubtedly pave the way for others this is also a project that will never be repeated. And that is because the pairing of technology and architecture is at the heart of the experience at GasOmeter Copenhagen. 🌐

Tech-Spec

Audio

d&b audiotechnik AL90, Y10P, 8S and 44S loudspeakers; SL-Sub and 21S-Sub subwoofers; DS100 matrix processors; En-Scene and En-Space software; and D80, 40D, 10D and 5D amplifiers
Digico Quantum 7 T mixing console
Luminex 30i switches
TTA Stagetracker II

Video

Disguise d3 4x4pro media servers
Eaton EMAH28 power distribution unit
Lightware HDMI20-OPTJ-RX90 receivers and HDMI20-OPTJ-TX90 transmitters
Netgear M4250-16XF, AXM765-20000S and M4250-40G8XF-POE+ switches
Panasonic PT-RZ120 projectors
Stouenborg silence enclosure for projectors
Vivolink VLHDMISPIX4 HDMI splitters