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Live: Eurovision Song Contest
From the Rotterdam Ahoy

Venue: Vertical Theatre
A tourable new concept

Tech Focus: Robe's Forte
The LED luminaire reviewed



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DIGITAL
EDITION

Doctor Who

Adventures in immersive theatre

INSTALL: PORSCHE MUSEUM, GERMANY • VENUE: INTERNATIONAL THEATRE AMSTERDAM
REVIEW: ISE 2021 - LONDON AND BARCELONA • COMPANY PROFILE: 00000 MUSIC
FUTURE TECH • PROFILE: SURFHIRE FOUNDER, SIMON HODGE - AND MUCH MORE ...



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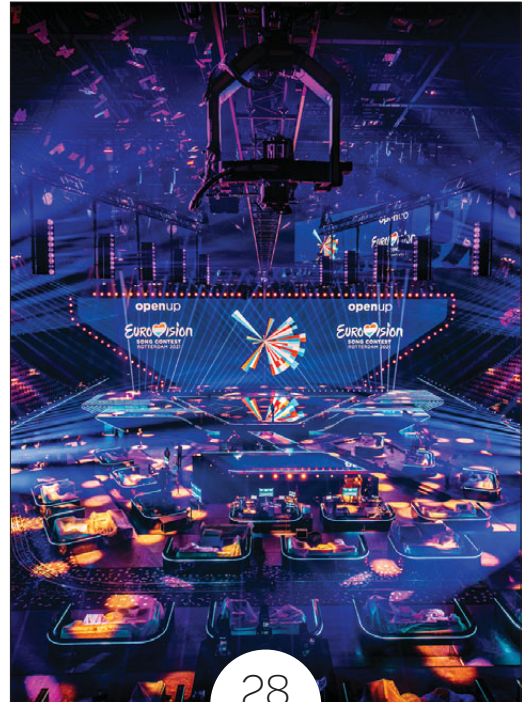
Photo: Mark Senior

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Doctor Who : Time Fracture

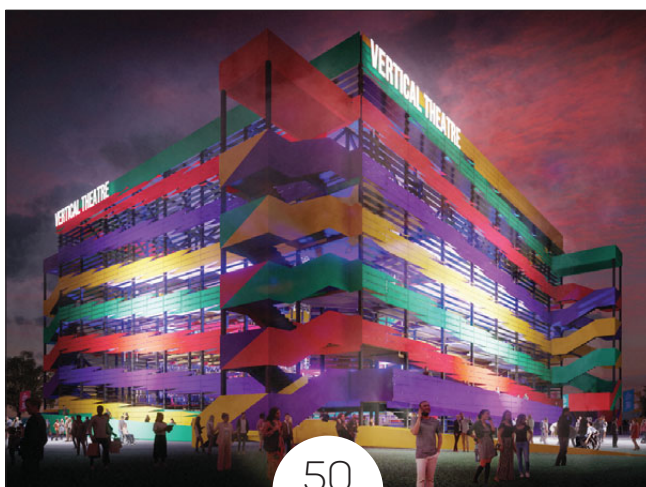
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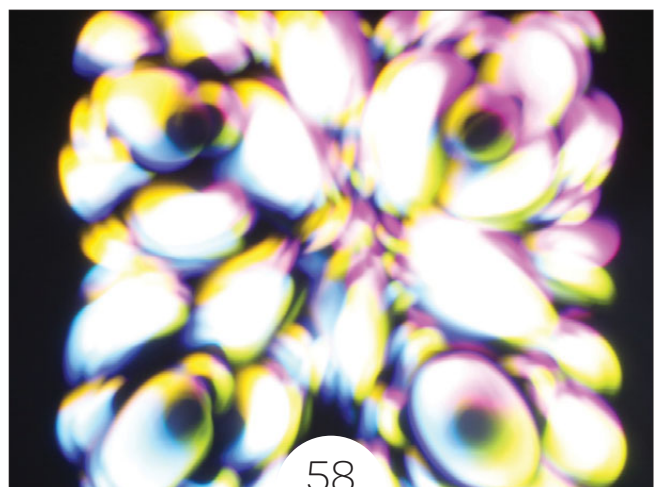
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*Subject to change

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PLASA Media aims to produce LSi with an approximate 60/40 split between editorial content and advertising respectively.



LSeye

Claire Beeson editor
claire.beeson@plasa.org

"Knowing a Time Lord would be really useful right now. Oh to be able to whizz forward and check on the industry's post-COVID recovery..."



This month we board the famous blue police box that is the TARDIS and take a trip through the 'wobbly-wobbly, timey-wimey' treat that is *Doctor Who: Time Fracture*, a new immersive theatre experience now playing in London. For his report on pages 40-46, Rob Halliday meets the creatives responsible for bringing the world of the British TV classic to life in great detail for audiences to enjoy their very own adventure in time and space - Time Lords, Cybermen, Daleks and all!

Let's be honest - knowing a Time Lord would be really useful right now. Oh to be able to whizz forward and check on the industry's post-COVID recovery; to see if we've lived through our last lockdowns; to see if football really does come home (as I write, England's just got through to the final of the Euros). Any Gallifreyans out there, feel free to send me spoilers!

Also inside, we present Kate Lyon's definitive report on this year's *Eurovision Song Contest* (pages 28-36), which finally took place at the Rotterdam Ahoy having been postponed in 2020. Used as a test event, the show was able to welcome a limited live audience to help bring that incomparable fan atmosphere, with various tweaks made to the production design and processes to enable a safe event all round. The result was the usual TV and live spectacular that wowed *Eurovision* fans far and wide. Find out how it all came together inside...

Meanwhile, Simon Duff gets the latest on The Vertical Theatre, a new concept in temporary venue design from entertainment architects Stufish and friends (pages 50-53). We also report on Stuttgart's stylish Porsche Museum, where a bespoke lighting system was developed to showcase a moving motor show (pages 20-21).

Robe's new Forte LED luminaire is our *Technical Focus* subject this month, with Mike Wood putting the unit through its paces to provide a comprehensive overview of the fixture (pages 58-64). Forte features Robe's innovative transferable LED engine, which saw the Esprite fixture win the company a prestigious PLASA Award for Innovation at the PLASA Show in 2019.

With the PLASA Show set to return to Olympia London this 5-7 September, the 2021 Awards for Innovation are now open for entries, meaning the latest batch of innovative products launched since the 2019 PLASA Show can be put forward for the coveted awards. For more information on eligibility and entry, check out page 10 inside, or visit www.plasashow.com/awards.

After such a long period without a good old industry get-together, I'm sure many of us look forward to this year's PLASA Show as a chance to reconnect with friends and colleagues from across the industry in person. Our next issue - September - will feature our usual PLASA Show preview to help you best plan your visit. Until then, enjoy this edition, and have a great summer! ☘



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EVENT

PLASA Show 2021 registration now open

[UK] Registration is now open for PLASA Show 2021. The leading trade event for entertainment technology will take place in Olympia London's Grand Hall on 5-7 September - and for one year only, the ABTT Theatre Show will be co-locating with PLASA Show, bringing two popular industry events under one roof.

Visitors will be able to connect with leading brands from the pro audio, AV, lighting, rigging and staging sectors, whilst a free seminar programme will once again offer advice and case studies on business and technical topics. There will also be various interactive offerings including live audio demonstrations, lighting console training, and more.

Meanwhile, the ABTT Theatre Show will have its own dedicated hub on the expanded show floor, giving it autonomy to retain its conversational atmosphere.

PLASA MD Peter Heath comments: "With live events and entertainment returning slowly but surely throughout 2021, we are confident that it is the right time to bring back PLASA Show. And we are equally pleased to partner with the ABTT, whose Theatre Show is a respected mainstay on the industry calendar. This co-location has double benefit: it takes the pressure off of both show's exhibitors, and connects a broader range of industry professionals for much-missed networking and face-to-face interaction. So, here's to



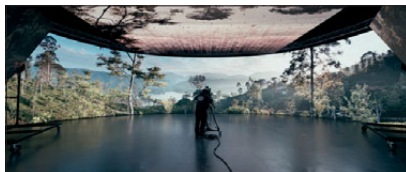
our big come-back in September! We look forward to welcoming you, in person, to PLASA Show 2021."

PLASA Show will be run in accordance with the government-approved 'All Secure Standard', published by the Association of Event Organisers. Any changes to government guidelines at the time of the show will be reviewed and strictly adhered to, say the organisers. To find out more and register for your free digital badge, visit the web address below . . .

➔ www.plasashow.com

BUSINESS

ARRI opens mixed reality studio in London



[UK] ARRI has opened a new mixed reality studio in the UK, equipped with 343sq.m of LED wall and installed in partnership with NEP Live Events and Creative Technology. Located at ARRI's premises in Uxbridge with camera, grip, and lighting packages available on site from ARRI Rental, the 708sq.m studio is being offered for hire to short and long-form productions of any kind, as well as for events, education and R&D purposes. The studio is one of the biggest permanent mixed reality production spaces in Europe.

Jannie van Wyk, MD of ARRI Rental, comments: "Collaborating with best-for-purpose suppliers of all the varied required technologies has enabled ARRI to deliver a full solution for mixed reality in our Uxbridge studio. These industry-leading hardware and software tools could not be better complemented than with ARRI cameras, lenses, stabilisers, lights, and workflow support, which can be provided to productions as a package deal on site."

➔ www.arrirental.com

www.lsonline.com

BUSINESS

SACIA works towards recovery in SA

[South Africa] The Southern African Communications Industries Association's (SACIA) Event Safety Council continues to work with the authorities to establish a 'roadmap to recovery' for the events sector, says the body. With its partners in the SA Events Council (SAEC), the body is actively engaged with the Department of Sports, Arts and Culture.

"It has been a rollercoaster ride, keeping one's wits about you, staying motivated and positive, and pressurising the government to recognise that our professional recovery plan will successfully keep people COVID-safe at the events we host," says interim chair Mike Lord. "The events industry is advocating recovery via the #TrustUs campaign and continuously lobbying the government to work with our experts to re-open our industry. Once the government takes our sector into their confidence, they will realise that we are a dynamic, professional, solutions-driven industry with implementable solutions that can safely open the road to recovery. The laws governing events in South Africa are already in place, and with enforcement and compliance, we believe we can hold organised events in a COVID-safe manner."

➔ www.sacia.org.za



Mike Lord, interim SACIA chair

PEOPLE

CFE's Amanda Speight elected to LIA council

[UK] CFE Lighting's Amanda Speight has been elected onto the Lighting Industry Association (LIA) council as a representative for commercial luminaires.



Speight is just one of three women to be elected to the 20-strong council, which represents the industry and helps shape policy, legislation, quality and supply chain behaviour.

Speight's career spans 35 years and started at her family's Huddersfield-based lighting business Speights Ltd, a founding member of the Lighting Association before it became the LIA. Today, she is the national business development manager at Lancashire-based LED lighting manufacturer CFE Lighting.

➔ www.thelia.org.uk

➔ cfe-lighting.co.uk

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INDUSTRY ISSUES

Back Lounge offers resilience workshops

[UK] A series of workshops that will teach live events professionals how to avoid a "shock to the system" when returning to the busy touring circuit are taking place this summer. Launched by tour manager Suzi Green, the sessions will explore strategies for dealing with high-pressure situations as well as rate negotiation, managing workload, techniques to combat jet lag, shift work, and more.

Available sessions include *Healthy Boundaries* with Laura Ferguson (14 July) and *Sleep & Jet Lag* with Matt Kansy (4 August). Find out how to register for either via the links below.

Green, who is a vocal mental health awareness advocate and during the pandemic founded The Back Lounge, an online support group for out of work touring professionals, says touring freelancers as well as the wider live music industry are invited to join the workshops.

➔ [//plasa.me/healthyboundaries](https://plasa.me/healthyboundaries)

➔ [//plasa.me/jetlag](https://plasa.me/jetlag)



Suzi Green: "We will all need to take our health seriously to survive"

INDUSTRY ISSUES

Study seeks data for mental health guidance

[UK] The effect of the pandemic on live event workers' wellbeing is the focus of a new study recently launched by the Alliance of Associations and Professionals in Theatre and Live Events (AAPTLE). The research seeks to expand the data gathered during the 2019 UK mental health industry survey, which was funded by PLASA, the ALD, the ASD, the ABTT and the PSA and conducted by Dr Paul Hanna. The aim is to produce guidance framework for businesses and venues.

Mig Burgess, ABTT trustee and chair of the AAPTLE Wellbeing Working Group, explains: "It is our aim, armed with the data collected from this latest survey, to produce guidance notes that will help venues and businesses make positive cultural change in the workplace, reduce the stigma around mental health issues, and create a safer framework for staff and freelancers to openly discuss their own wellbeing issues."

You can complete the survey via the link below. All responses are confidential and anonymous, and participants can withdraw at any time.

➔ [//plasa.me/mentalhealthevaluation](https://plasa.me/mentalhealthevaluation)

BUSINESS

Bluesound Pro adds three distributors

[UK] Bluesound Professional has added three global distribution partners: Studiotec Oy for Finland, Gonher Proaudio for Mexico and HED Cinema for Israel. "We are delighted to be able to welcome these distributors to our team as they are all leaders in the industry and in their respective markets," says Graeme Harrison, vice-president and general manager of Bluesound Professional.

Since its launch at the Integrated Systems Europe show in February 2019, Bluesound has expanded to 23 international markets.

➔ www.bluesoundprofessional.com

➔ www.studiotec.fi

➔ [//gonherpro.mx](https://gonherpro.mx)

➔ www.hedcinema.co.il

PEOPLE

Audiologic expands applications team

[UK] Audiologic has appointed Amber Jones to its applications team, where she will serve as junior application support engineer. Jones joins the company as the fourth graduate hire from the University of Hertfordshire after studying Audio Recording and Production.

➔ www.audiologic.co.uk



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VOICES IN THIS ISSUE

"00000 Music is likely to pop up - literally - on tours and at festivals . . ."

p16 Phil Ward discovers a new app for the live music industry

"Porsche . . . are very, very picky about the visual element . . ."

p20 Martin Kuhn on delivering custom lighting for the Porsche Museum

"Production planned an event that could host all possible scenarios using a single arena layout . . ."

p28 Erwin Rintjema on staging *Eurovision 2021*

"I once mixed Ed Sheeran in a gazebo a few years before he broke . . ."

p38 Chris 'Showfile' Harding reflects on his career

"The stream that runs through the middle of the venue is real, one of London's lost rivers that still flows under Oxford Street . . ."

p40 Rebecca Brower on creating the set for *Doctor Who: Time Fracture*

"I could foresee artists using The Vertical Theatre in their home town for a run of concerts . . ."

p50 Jake Berry on the many uses of the Stufish co-designed events space

"It showcases the next version of their in-house removable LED light engines . . ."

p58 Mike Wood reviews the Robe Forte luminaire

EVENT

PLASA Awards for Innovation open for entries

[UK] The widely-respected, independently-judged PLASA Awards for Innovation return as part of PLASA Show this September, in association with LSi. Exhibitors are invited to enter eligible products by 6 August, with judges able to bestow up to eight standard awards as well as a dedicated Award for Sustainability and a Gold Award for an outstanding new product.

To be eligible, products must have been launched in the period since the last PLASA Show (which ran in September 2019) and meet the criteria for innovation, which includes improving technical practice, introducing new technology, materials and techniques, and offering a new commercial advantage. For full entry criteria and further information, visit the web address below...

➔ www.plasashow.com/awards



BUSINESS

Renkus-Heinz appoints Intersonic

[Finland] Intersonic Oy is now providing import and distribution of Renkus-Heinz products through its resellers and integrators. The company specialises in the import and sales of AV equipment for the Finnish market and offers a comprehensive range of products for the experience and events industries, as well as lighting, sound, video, and AV communication solutions for retailers, contractors, and companies.

➔ www.intersonic.fi

➔ www.renkus-heinz.com

TRAINING/EDUCATION

APH offers DAS Audio-based training platform

[UK] Brighton-based Acute Audio Productions has launched a hire division - Audio Production Hire (APH). Alongside production services for the industry, APH offers an online training programme based around DAS Audio products. Courses available through on-demand video tutorials include DASnet, EASE FOCUS and DASaim, whilst the more advanced courses incorporate one-to-one teaching. APH is hoping to also introduce in-person sessions once COVID restrictions are lifted.

MD Giles Bristow explains: "Together with audio engineer Simon Ryder, we have created a module-based training programme, Sound System Engineering - The Environmental Approach from Beginner to Advanced. These training modules have been designed to highlight the environmental approach to sound system design and the capabilities and effects of being able to control the sound wave/audio map from the PA system and the benefits and use of the setup of the system on a network."

➔ www.aph.uk.com/training

BUSINESS

Hologramica opens London demo studio



[UK] Hologramica, specialist in the design and production of holograms, has opened new demo studios in Wandsworth, London thanks to music charity NEKO Trust. The studios are equipped with a 7m 3D Holonet rig alongside a portable Holopops Ultra system, whilst a 'filming room' can live broadcast life-size holograms. Hologramica is currently booking in-person and Zoom demos of both systems.

Liz Berry, CEO of Hologramica, comments: "We were struggling to find a home when the NEKO Trust, headed up by Glen Rowe, came to our rescue. We now occupy a beautiful, secluded rehearsal facility."

➔ www.hologramica.com

BUSINESS

Powersoft adds Sidev for France

[France] Powersoft has appointed Sidev as its new distributor for France, to work alongside the manufacturer's other French representative, DV2. Founded in 1991 and based near Lyon, Sidev has been a key AV solutions provider in France for over 30 years. Currently part of the Midwich Group, the company has one of the largest sales and pre-sales teams in the country as well as two showrooms in Paris and Lyon.

➔ powersoft.it

➔ www.sidev.fr

PEOPLE

Martin Audio promotes from within

[UK] Martin Audio has recently promoted from within to create two new director roles for its R&D department. Phil Anthony (*top*) has been promoted to associate director of design, while Ambrose Thompson (*right*) is now research director, and together they will lead the R&D department.



MD Dom Harter comments: "Between them, Phil and Ambrose have over 35 years of experience within Martin Audio, so not only is the R&D department in safe hands, it's a recognition of their success and commitment to the company in that time. We have a truly exciting three-year roadmap ahead, covering both software and product hardware, and I couldn't be more delighted that they will lead us to new heights in offering world class solutions for our customers."

➔ martin-audio.com



Lionel Roudil (Sidev) and Fabrizio Bolzoni (Powersoft)

INDUSTRY ISSUES

Take1 charts road to recovery for live events

[USA] Entertainment industry insurance solutions provider Take1 Insurance has released a new educational white paper entitled *Reopening Live Events Safely: An Industry View*. The paper discusses strategies for returning to work, while managing risk. It features input from industry experts, including production professionals, underwriters, brokers, and safety specialists, to help provide a clear understanding of what's involved in returning to work safely.

➔ take1insurance.com

BUSINESS

Martin Audio opens online merchandise store



[UK] Martin Audio has launched a new online merchandise store to coincide with its 50th anniversary year. A comprehensive range of clothing and accessories is now available for shipment across the world. Items include backpacks, face masks and coverings, t-shirts and polo shirts, as well as hoodies, sweatshirts, jackets, baseball caps and beanies, body warmers and embroidered logo Barbour jackets. Other accessories include mugs, golf umbrellas and lanyards.

➔ store.martin-audio.com

BUSINESS

TSL bolsters sustainability with isla

[UK] TSL Lighting has joined the events sustainability organisation, isla. TSL is the first technical equipment provider to join the collective, which has members from a range of events sectors including Jack Morton Worldwide, George P. Johnson, and Amplify.

TSL says it has utilised sustainable practices for years, but the downtime during the past 12 months has allowed the company to reflect and further implement environmentally friendly initiatives. Director Loz Wilcox says: "Joining isla really aligns with our core company values, so we're thrilled. isla offers resources, training and tools from across the events sector which will help fuel TSL's goals to reduce waste and carbon emissions and support our industry to transition to more sustainable events."

➔ www.tslighting.com

➔ weareisla.co.uk

PEOPLE

Xytech names Tanya Kelly MD for APAC

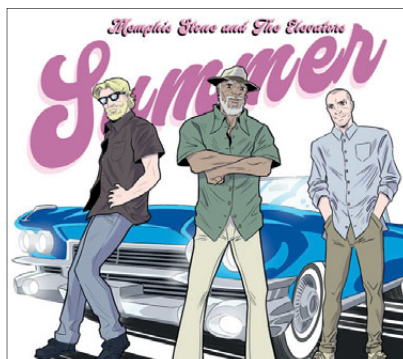
[APAC] Xytech has named Tanya Kelly as managing director for Asia-Pacific. For over six years, Kelly served as a sales and solution consultant for ScheduALL's broadcast and broadcast service provider customers in the Australia and New Zealand region. Her background includes technical operations, having spent nine years as head of studio operations at Fox Sports Australia, as well as a stint at Deluxe as head of bookings.

➔ www.xytechsystems.com



CHARITY

Rock tune proceeds boost Make It Blue



[UK] Indie rockers Memphis Stone are donating the proceeds from their song *Summer* to mental health charity Make It Blue. Written in the first UK lockdown, *Summer* is an ode to better times and the return of music festivals. Make It Blue director Tim Owen says: "While the industry is doing its best to open up again, the short- to medium-term future remains bleak for many as people suffer stress over debt and threatened homelessness. We're trying to fund financial, emotional and therapeutic support for people struggling with mental health through COVID-imposed poverty." The song can be downloaded via all popular streaming services.

➔ smarturl.it/summersingleoutnow

➔ www.makeitblue.uk

Daily industry news :

➔ www.lslionline.com

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INDUSTRY ISSUES

Music Support & TPG launch addiction initiative

[UK] Monthly addiction awareness training has been set up to tackle “one of the biggest challenges” faced by touring professionals. Commissioned by Tour Production Group (TPG) and delivered by charity Music Support, *Addiction and Recovery Aware* will teach delegates how to recognise signs and symptoms of addiction, understand the factors that perpetuate the cycle of addiction, and learn how to intervene. The training, to be carried out online or in person, is suitable for industry professionals interested in understanding more about addiction and helping others. There is a £100 fee per delegate, but you can apply for a bursary to cover the full amount.

Suzi Green, one of TPG’s mental health and personal wellbeing facilitators, comments: “Engagement with our members showed that addiction is one of the biggest challenges touring crew and musicians face. After a number of TPG members completed Mental Health First Aid Training, we felt a separate short course in addiction and recovery awareness would be really beneficial.”



The training is scheduled monthly starting from 13 July, with dates through to April 2022. For more information on how to apply, visit: [//musicsupport.org/addiction-and-recovery-workshop](http://musicsupport.org/addiction-and-recovery-workshop)

BUSINESS

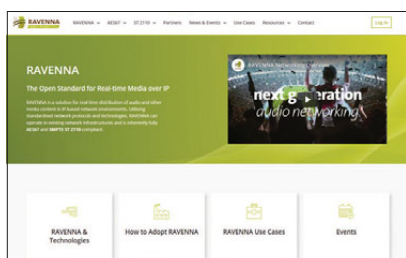
Van Damme appoints in Germany

[Germany] Van Damme Cables has agreed an MI-only distribution partnership with German audio industry specialist, Audiosteps. The partnership will offer German customers support and availability of the latest products, including Van Damme Silver Series guitar cables, Starquad and Classic mic cables as well as the Blue and Black Series speaker cables.

➔ www.audiosteps.io
➔ www.van-damme.com

BUSINESS

Ravenna goes live with new website



[World] ALC NetworkX, developers of the Ravenna AoIP networking technology platform, has announced that the new Ravenna website is now live. Already established as a comprehensive resource for AES67 information, the new site aims to provide the same level of information for SMPTE ST 2110 whilst sporting a more modern look and feel. One of the site’s key new features is a searchable database of Ravenna products, whilst access to certain tools and resources will still require users to log in.

➔ [//ravenna-network.com](http://ravenna-network.com)

EVENT

Peerless-AV to host London networking event



[UK] Peerless-AV is hosting an AV exhibition and networking event on 16 September at Lord’s Cricket Ground in London. AV and digital signage brands due to exhibit include Absen, Philips, Samsung, NEC, Kramer, Sony UK, Iiyama, Datapath, Hypervsn, Signagelive, Tripleplay and Matrox. The AV User Group, *AV Magazine* and AVIXA Women’s Council UK will also be involved.

➔ [//peerless-av.com](http://peerless-av.com)

BUSINESS

DirectOut and Vivivaldy join SRT Alliance

[Europe] German-based audio network specialist DirectOut and Italian IT system provider Vivivaldy have joined the Secure Reliable Transport (SRT) Alliance. SRT is a free open-source AV transport protocol and technology stack originally developed and pioneered by Haivision that enables the delivery of high-quality and secure, low-latency audio/video across the public internet.

Luca Di Chio, CEO of Vivivaldy, comments: “As Vivivaldy we’re proud to join the SRT Alliance to implement the open-source AV transport protocol into our VPN-routers. We think it’s a way to bring additional value to our clients. As the three pillars of ViViD are simplicity, low-latency, and reliability, SRT helps us to guarantee a steady, glitchless audio transmission to open new scenarios and possibilities to live and broadcast streaming events via public internet infrastructures.”

Jan Ehrlich, CEO of DirectOut, adds: “Reliability has always been an important principle for DirectOut. Our hardware is built to be solid and to grant high quality and the same concept stands for our AoIP implementations. The SRT Alliance follows the same approach of secure and reliable network transmission for maximum quality, so joining the alliance perfectly matches with our company goals.”

➔ www.directout.eu
➔ www.vivivaldy.com

PEOPLE

CTME grows project management team

[UAE] Tom Warneke has joined Creative Technology Middle East (CTME) as a senior project manager for the live events division. He has over 15 years of experience in the events industry across Australia, Asia and the Middle East.

➔ www.ct-group.com



Daily industry news :
➔ www.lslionline.com

BUSINESS

ACT launches US-wide operation

[USA] ACT Lighting has launched ACT Entertainment, a new entity formed by bringing together the brands of the ACT Lighting and RHC Holdings family of companies. Headquartered in Jackson, Missouri, ACT Entertainment will also operate from facilities in New York, LA, Toronto, Texas, and Massachusetts.

Dale Williams, president and COO of ACT Entertainment, explains: "Given the challenges faced by the entertainment industry in the past year, it was clear to us that we needed to be a more unified and efficient organisation, a more nimble and agile entity that works more effectively together. The need for internal change grew organically as our industries evolved and changed. By unifying all of our companies into a single solution, ACT Entertainment positions ourselves to better service each of our markets as their industries rebound."

▶ [//actentertainment.com](http://actentertainment.com)

TRAINING/EDUCATION

Meyer's Spacemap Go roadshow rolls on

[USA] The Meyer Sound Spacemap Go roadshow will roll across the US through the summer and autumn with stops in 10 cities, including sessions in conjunction with the Church Facilities Conference & Expo in Dallas and InfoComm 2021 in Orlando.

The demo sessions are focused on Spacemap Go, Meyer Sound's spatial sound design and live mixing tool, although the touring system also showcases other new technologies as incorporated in the Ultra-X20 loudspeaker and VLFC very low-frequency control element. Confirmed locations include Atlanta (12 July), Boston (27 July), Philadelphia (11 August), Lititz (12-13 August), Clearwater (23-27 August), Seattle (8-12 November), Portland (29 November-3 December) and Los Angeles (27-29 December). Additional stops are planned for 2022, and Spacemap Go demo sessions will also feature at NAMM in Anaheim in January 2022 and ISE in Barcelona in February 2022.

▶ [//meyersound.com/events](http://meyersound.com/events)

PEOPLE

Visualization appoints commercial director

[UK] Technical solutions distributor Visualization has appointed James Belso as commercial director to spearhead its end user and consultant activity. He will also be charged in developing Visualization's business and growing its partner network. Having worked for Christie Digital Systems for over a decade, Belso has recently been focusing on the consultant community and key end users.



▶ www.vizuk.com

▶ www.lslionline.com

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INDUSTRY ISSUES

ABTT announces Virtual Ideas Platform

[UK] The ABTT has unveiled its Virtual Ideas Platform. Established in collaboration with Guildhall School of Music & Drama, the platform will serve as an informal introduction service between independent creative innovators and commercial developers behind the sectors' leading brands, products and services. It is open "to anyone and everyone with an idea" and aims to recognise and help realise new ways of making theatre work.

The ABTT says: "The platform is here to recognise, salute and honour those innovators in our midst. By its very nature, theatre is a dynamic working environment in which to invent and develop new and

better ways of doing things - in special effects, costume and wardrobe, wigs, make-up and hair, scenery, stage, sound, lighting, automation, AV and any other discipline which makes live performance happen."

Submissions to the Virtual Ideas Platform can be made via the application form linked to below by 20 August. To better demonstrate their idea, applicants can upload supporting information such as pencil drawings, recorded verbal descriptions, 3D drawings, and video.

The winning idea will be awarded initial stage seed funding for developing and prototyping.

➔ [//abtt.vip](http://abtt.vip)

BUSINESS

Main Light expands to Las Vegas

[USA] Main Light is opening a new location in Las Vegas this August. The new 40,000sq.ft shop, at 6435 South Valley View in Las Vegas, will allow the dry hire service to better support its clients in western USA. Main Light has also recently unveiled a logo and introduced a company-wide 800 number, (800)-397-MAIN (6246).

➔ www.mainlight.com

BUSINESS

Austrian Audio grows international distribution

[Austria] Austrian Audio reports "making big strides in the last year", thanks partly to the "excellent cooperation" with its distributors. The company, which started in 1917 following the closure of AKG's Vienna offices, has seen growth not only in the US, where the distributor Group One has opened a large number of stores for Austrian Audio, but also internationally.

In the past six months, the company has added new distributors in Chile, Mexico, India, Singapore and Thailand. Additionally, Austrian Audio products will start shipping to Iceland, Malaysia, Brazil, Malta, South Africa and Russia this summer.

➔ [//austrian.audio](http://austrian.audio)

TRAINING/EDUCATION

Free courses from Shure



[UK] Shure has launched a new e-learning programme for live performance, production, AV rental, and film/location sound professionals. Split into three levels: Fundamentals, Shure Product Training, and Advanced Application Training - the programme aims "to equip everyone with various levels of technical knowledge", from those new to the industry to seasoned professionals. The courses are offered through the Shure Audio Institute learning portal, which requires registration. To find out more or sign up, visit the link below . . .

➔ [//plasa.me/shureproaudiotraining](http://plasa.me/shureproaudiotraining)

BUSINESS

Mediatec Asia Pacific rebrands as part of CT

[Australia] Mediatec Asia Pacific, an NEP Live Events company, has re-branded to become part of Creative Technology (CT), a sister company also under the NEP Group. A change in name and branding only, the combined brand enables NEP and CT to support its corporate and sports clients in Australia and New Zealand as a true 360° supplier. The newly-formed CT Australia and New Zealand business unit has office locations, warehouse facilities and staff in Auckland, Melbourne, Perth, Sydney and Wellington.

➔ www.ct-group.com

PEOPLE

Christie Pro team adds two directors

[USA] Christie has appointed Francois Godfrey (*top*) and Maz Zaefjou (*below*) as directors of sales and business development for the Professional Services team. Godfrey has previous experience as director of projection and technical services at a cinema exhibitor and has held a variety of sales and marketing roles with AV manufacturers. Zaefjou has been with Christie for five years, having served as a senior manager in its Enterprise division, and has 25 years of experience managing sales and engineering projects across multiple industries.

➔ www.christiedigital.com



BUSINESS

Apex Technologies debuts as US distributor

[USA] Several respected industry figures have joined forces to form Apex Technologies, a new distribution company that promises to bring new entertainment technology solutions to North America. Founded by Bill Morris, Anders Karlsson, Tarmo Krimm and Ola Melzig, the company will offer lighting, AV, staging and power supply products that are not currently represented in the US market.

CEO Bill Morris explains: "All four of us have either lived in or travelled the world extensively and can clearly see the creative differences in the way live productions are done outside of the US. There are some great products that just need to be available to the American market. So, we decided to form a US distributor of exclusive products to help facilitate a more global live entertainment industry."

Among its represented brands, the company has listed Display Technologies; Meridian Audio, TPI Cinema, NextGenTec, DTS Lighting and others.

➔ www.apex-tech.us

Daily industry news :

➔ www.lslionline.com

➔ www.lslionline.com

EVENT

Fairport's Cropredy Convention postponed again

[UK] The organisers of Fairport's Cropredy Convention have said they were "left with no other option" than to postpone the Oxfordshire-based music festival for a second year running. The event was set to take place on 12-14 August this year but will now be staged on 11-13 August 2022 with the current line-up hoped to be carried forward and purchased tickets remaining valid.

"We're left with no other choice than to postpone our festival again," says festival director Gareth Williams. "The dilemma we are facing is simple - proceed and risk potentially going out of business or postpone for a year and live to fight another day. So far, despite over six months of lobbying, the government has failed to support any form of COVID-related cancellation insurance scheme for the festival industry. Also, there has been no guidance on what mitigations might be required post-step four. This has made it effectively impossible to plan this year's event."

➔ www.fairportconvention.com

BUSINESS

RM Multimedia restructures and expands



Ingo Dombrowski (Robe), Paula Porolisceanu and Ermanno Tontini

[Italy] Distributor RM Multimedia has restructured and is expanding following the untimely death of one of its founders, Marco Bartolini, who passed in February. Bartolini, alongside Paula Porolisceanu and Ermanno Tontini, founded the company in 2007. To maintain operational continuity, Porolisceanu is stepping into the role of owner and MD, with Tontini acting as chief technology officer. The duo will also lead the company's sales team headed by Michele Sgolacchia. RM Multimedia represents brands including Robe, Robert Juliat, Infilid, disguise, BlackTrax and Luminex among others.

➔ www.rmmultimedia.it

CHARITY

BTS announces Mental Health First Aid training

[USA] The Behind the Scenes Mental Health and Suicide Prevention Initiative has posted new online Mental Health First Aid training classes for entertainment industry workers in the US. Taking place during August, the training will be delivered in two parts - a self-paced online course and a six-hour virtual, live instructor-led session. Upon course completion, delegates will become certified Mental Health First Aiders, which is valid for three years.

The registration fee is \$125, but IATSE members and those working under IATSE agreements may be eligible for Training Trust Fund reimbursement. A limited number of partial and full scholarships are also available.

USA: ➔ btshelp.org/mhfa

Canada: ➔ afchelps.ca/mhfa

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Retail therapy

Online shopping platform OOOOO has added a music channel that could help artists interact with fans during the pandemic. Phil Ward tries it on . . .

[UK] UK broadcaster and historian Andrew Marr has accurately described the victory of shopping over politics in post-war Western society. Consumerism has arguably usurped voting, and if it has it happened well before the pandemic. Any initiative to boost it further since the virus - namely online - has been well-timed. And if the music business can get a slice of the pie, even better.

To the casual observer, a shopping concept called OOOOO could be read as letters or numbers. Alphanumerically, it's flexible. But it works both ways: as the letter O five times, it makes the same noise my daughter makes when she tries on something gorgeous. As five zeros, it expresses in binary terms the size she would like it to be, in a perfect world. Shopping is nothing if not aspirational.

To a network of online channels including Cosmetics.tv, Sneaker.tv, Handbags.tv, Shoes.tv and Perfume.tv has been added OOOOO Music, the latest platform dreamed up by founders Sam Jones and Eric Zhang and headed up in the UK by Gaby Cartwright. "Sam worked in Hong Kong, where he met Eric who was a head engineer at TikTok," she explains. "They grasped the potential of influencer marketing and created the OOOOO app, which replicates and Westernizes the multi-billion-dollar Chinese livestream shopping apps Pindoudou and Kuaishou. It's rapidly gaining a cult following with over 200,000 downloads."

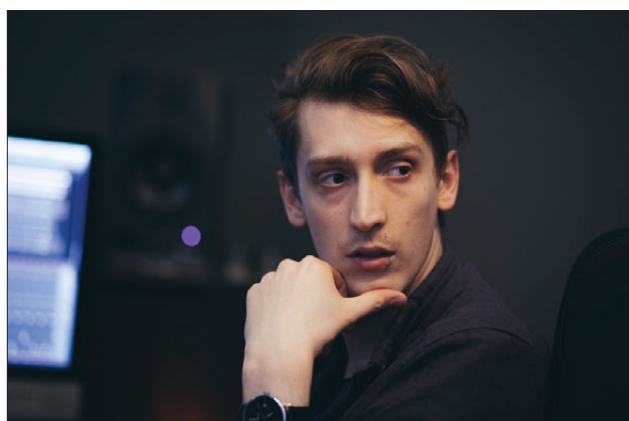
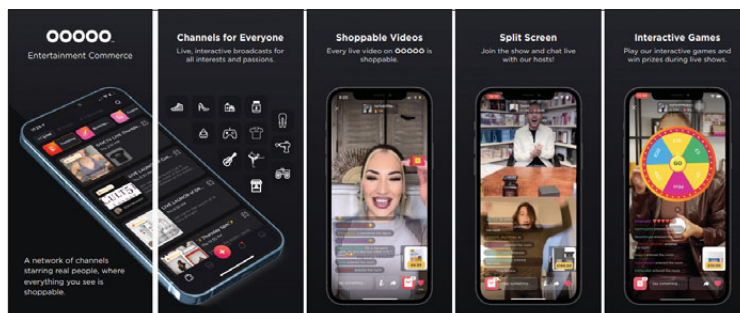
Significantly, OOOOO Music is not a way of selling tracks for download. Now that dedicated studios are being built to stream live performances, it provides artists with the platform to engage directly with fans in realtime: the focus is on selling artist merchandise, physical records and brand affiliated product. The first has been completed in London's Soho, for maximum showbiz kudos despite its humble origins as



a dry-cleaning shop. "Thanks to 4G, we've been able to overcome the previous shortcomings of internet speed in this neighbourhood," adds Gaby's brother Ben Cartwright of BJC Music, producer, engineer, musician and guiding light behind the audio spec for the studio. "And the Vodafone modem that we went with is 5G-ready. We already get a stable enough upload to run the shows. Being here creates a real café gig vibe and adds promotional opportunities in the same way that the old Virgin Megastore PAs used to - bands passing through London, hitting the West End."

"It's totally live with no downloads available later," adds Gaby, "and is the complete mobile user experience. The buying options that it generates never interrupt the gig and the artists can even thank buyers individually. For artists in today's crisis, it's a real revenue lifeline."

The team has secured sponsorship to equip the venue with Shure microphones, and following Ben's advice, has invested in a Behringer X32 Compact mixing desk. Performances are streamed exclusively via the OOOOO platform, and the lightweight kit



↑ From top: The studio has a casual atmosphere and is equipped with a lightweight audio kit

OOOOO Music provides artists with the platform to engage directly with fans in realtime

Ben Cartwright

"Now that dedicated studios are being built to stream live performances, it provides artists with the platform to engage directly with fans in realtime..."

adds to the casual, intimate atmosphere created by bar stools, cushions and a window onto Soho through which the vista is completed by the Lebanese mezze outlet opposite and passers-by having a quick nose at whatever's going on inside.

Encoding relies on Open Broadcaster Software (OBS), a no-frills open-source package exploited for its simplicity. "We haven't played too much with the default settings," Ben acknowledges. "The video encoding is x264 and the audio is AAC, and we did some fag-packet maths to work out what our maximum output bitrate was going to be in relation to the percentage of upload speed available - just making sure we weren't asking too much of the system from our end. We haven't done extensive tests on different platforms, for example. We've built something and it works!"

On the basis that users will be listening on a phone without headphones, bandwidth economy is assured by a purely mono audio output. This calls for the kind of judicious mixing that hasn't been around since Phil Spector. "I tend to have a low cut up to about 80Hz," Ben reveals, "which is fine for the intimate, stripped-back performances that we're doing. We're not using silly sample rates to allow for the high frequencies that the human ear can't detect and wasting bandwidth that way. A buffer size of a couple of seconds isn't going to be a problem for anybody. The artists do watch the stream in the studio so they have a delay, but that's so they can read the comments, and of course it's not their audio monitor feed."

OOOOO Music is likely to pop up, literally, on tours and at festivals so that the wider merchandising dimensions of the events are made available to the internet audience. "Even if you're at the gig and you don't want to carry the goods," Ben points out, "you can jump on the app, scan a QR code and have it delivered for when you get home." It's just one of the ways innovations like this will survive the pandemic, having injected - see what I did there - new dimensions into the music business borne of necessity and matured with expertise.

"I can't see streaming and virtual events going away," Ben agrees, "especially now they've been accelerated by the lockdowns. It was happening already, but now has a new prominence. I'm sure it will develop alongside live music and the events industry in general."

"The Soho studio doesn't have an audience in the room, which is how we've been able to fire it up during lockdown," he continues. "But there's no reason why the platform itself can't work just as well, if not better, with audiences anywhere. The studio will take on extra functions, I'm sure, from fashion shows to product launches, and could become a music venue in itself. It's a very useful hub to have in Soho, and I expect there to be others in key cities around the world. It wasn't expensive, in terms of equipment needed, and is completely customisable. You could replicate it in any similarly suitable space."

Look out, dry cleaners. OOOOO Music is removing COVID stains. ☒

▶ //ooooo.com

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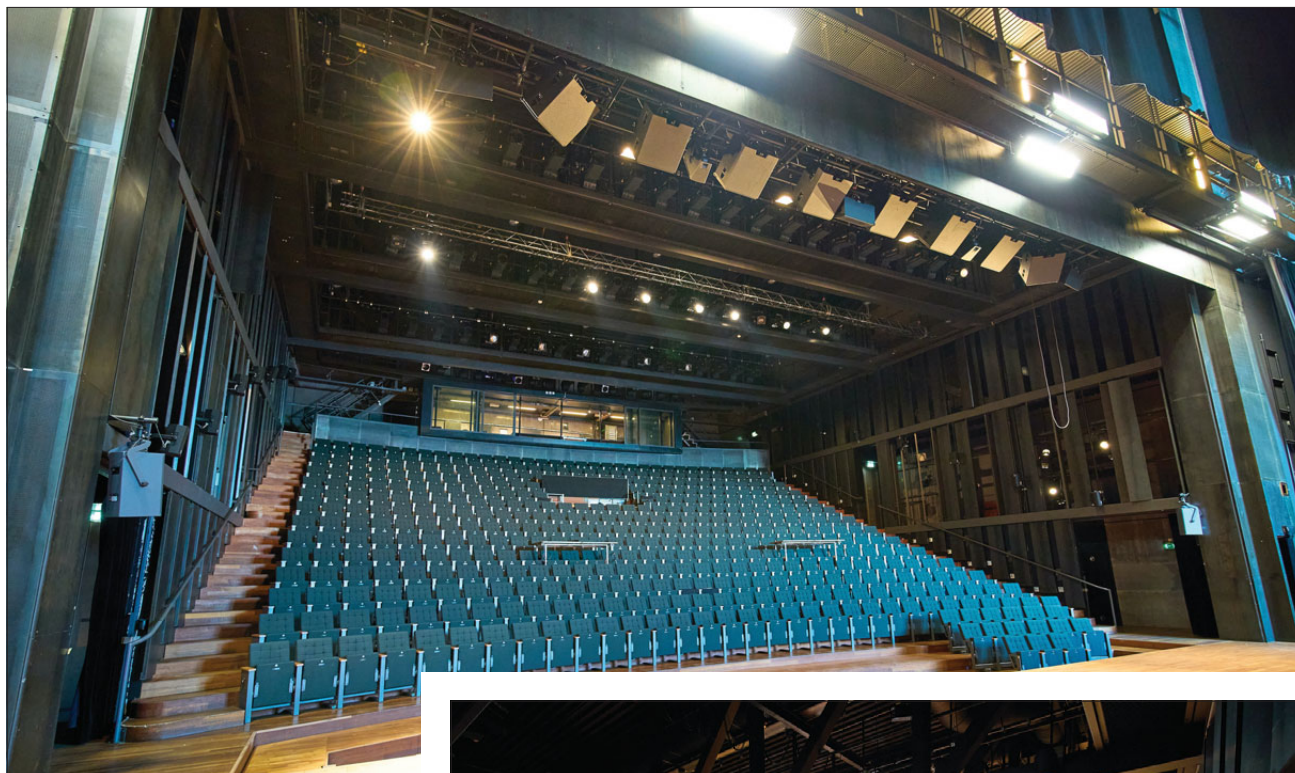
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Futureproof sound

International Theatre Amsterdam readies itself for an immersive future with a new audio installation. LSi reports . . .



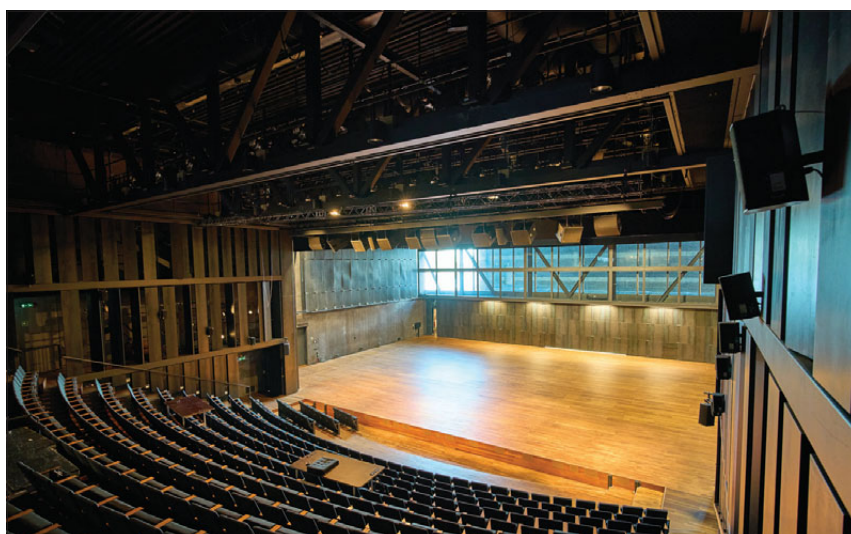
[The Netherlands] The International Theatre Amsterdam (ITA), formerly the Stadsschouwburg, has in its many forms been one of the leading theatres for performing arts in the Netherlands since it opened in 1638. Today, the 750-seat hall welcomes both Dutch and international artists and directors through its doors on Leidseplein, a busy square at the southern end of Amsterdam's central canal ring. In addition, an ambitious schedule of 600 performances and social programmes across 100 international stages positions the ITA prominently on the global theatre landscape . . .

CULTURAL MEETING PLACE

It was the venue's long-standing relationship and eventual merger in 2018 with house company Toneelgroep that paved the way for a multitude of renovations and upgrades, creating the contemporary theatre and cultural meeting place now known as the ITA.

The decision was made to upgrade the ITA's aging d&b C- and Q-Series installation, helping the venue to realise its needs for improved coverage, flexibility and control; all important factors for a space with aspirations of delivering an even more extensive and varied programme. "We already had d&b in-house and were very satisfied with it, but we were looking for more control and flexibility coverage-wise," comments Erwin Sterk, head of sound at the ITA.

As a result, Dutch d&b distributor Amptec was enlisted to co-design the new



system, drawing on the latest technologies available to them. The company supplied a system based on the d&b A-Series in combination with Y-SUBs as well as Y point sources to complement the existing 5S front-fills and E3 delays. The theatre also opted for an R90 touchscreen remote control as well as a DS100 signal engine, readying the ITA for a d&b Soundscape immersive audio system in the future.

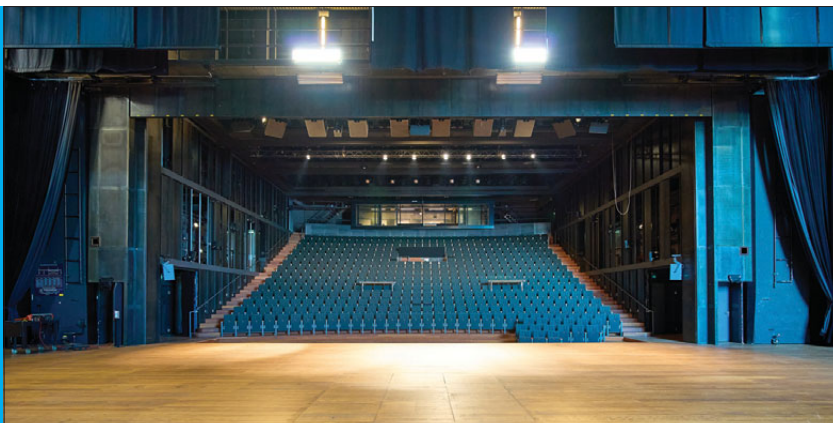
"The theatre is often used as a flat floor space, so the main request for our PA design was to keep the view to the stage unobstructed by loudspeakers," says Fred den Dulk, commercial project manager at Amptec. "The idea was to fly the whole PA, including the SUBs with minimal visibility.

1 The 750-seat hall welcomes local and international performers

The theatre's previous d&b installation was upgraded and the venue also installed a DS100 signal engine and R90 touchscreen control

"The new system is really transparent and multifunctional, which is so important as we host such a broad spectrum of performances ..."

- Erwin Sterk



In ArrayCalc, it became quite obvious that the A-Series would provide maximum control and coverage in relation to footprint."

The d&b A-Series is particularly suited to mid-sized venues with a need for varied audio coverage and fits the requirements of the ITA well. The augmented array enables the venue to utilise different splay angle configurations, resulting in coverage that can be adjusted and adapted for different applications.

TRANSPARENT AND VERSATILE

The theatre is not only used for live performances but also community events, making it crucial that non-technical staff can

operate the system. With this in mind, Amptec installed an R90 touchscreen remote control panel so that preset system configurations and other predefined functions could be quickly accessed at the touch of a button.

"The reason we suggested an R90 was to have an easy way of configuring the PA setup," den Dulk explains. "We created customised presets for the R90 to simplify integrating the digital format converter and audio router with the desired PA setup. The DS100 can be used as an insert on the converter and also be recalled by the R90. For special projects, the DS100 can be used as a matrix to allow the theatre to create localisation by creating delay

via matrix cross points. It also means the ITA can easily expand their system to Soundscape in the future."

That flexibility and scope for expansion within the new system has not gone unnoticed to the team at the ITA. "The d&b workflow with R1 and the DS100 allows us to store our productions and recall them when they are revived in the coming seasons," concludes Sterk. "The new system is really transparent and multifunctional, which is so important as we host such a broad spectrum of performances." ✕

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Innovation in the driving seat

Lighting manufacturers pooled their expertise to create a bespoke lighting and control solution fit to illuminate automotive masterpieces. Kate Lyon reports . . .

[Germany] The name Porsche has always been associated with quality, design and a certain nuanced clean and minimalist look that has characterised its iconic range of cars down the years. In 2009, the company opened the Porsche Museum in Stuttgart. The building's architectural design reflects the concept of Porsche design: a very clear, polygonal space with no right angles internally and a variable ceiling height from about 3.5m to over 10m. Importantly, everything is white.

Necessity is famously the mother of invention, so consequently when the time came to replace the original Source Four PAR, profile and various rail-mounted discharge spotlight fixtures that had illuminated the ever-changing 80 or so exhibits, project manager Martin Kuhn (who had partnered with Gregor Sgonina of Konzeptlicht Lighting) looked for a solution that would sit perfectly in this unique environment.

"The main aim was to update and modernise the lighting system," says Kuhn. "Both the quality and the efficiency of the system needed to be significantly improved. We had to find a fixture that would tick both these boxes as well as enabling us to easily refocus and feature individually and grouped, dimmable luminaires.

"The vehicles displayed are continually rotated as there is not sufficient space to show all the 700+ vehicles Porsche holds in storage. Each new exhibit requires a refocus and a reprogramme - previously only possible with a night-time visit with a cherry picker; a good deal of time, cost and effort that often resulted in a less than satisfactory outcome."

LET THERE BE MORE LIGHT

Kuhn and the team carried out an extensive analysis of the room and the conditions. It was clear that the previous maximum levels of 1,200lx were not sufficient; packages that created more than 5,000lm were



Photo: Amanda Holmes



Photo: Amanda Holmes

"We had to find a fixture that would tick both these boxes as well as enabling us to easily refocus and feature individually and grouped, dimmable luminaires . . ."

– Martin Kuhn

required to offer the desired levels of minimum 2,500lx on the exhibits. The situation needed a completely fresh approach to address the issues of refocusing, programming, dimming as well as the need for a much greater intensity of white light. The concept of motorised adjustable track-mounted spotlights came up and was quickly perceived as a fundamental game-changer.

"Years ago, I was part of a project looking to design a white light only fixture to service what is, essentially, the very niche market of lighting

cars as exhibits," continues Kuhn. "Seeing true colour and shape is at the very centre of successful vehicle lighting and not as straightforward as some might imagine. Back then the technology had not quite developed sufficiently, and it was deemed too small a sector to invest large amounts of R&D in. However, with the advancement of technology and the support of Porsche, it was decided to develop a luminaire that would meet all our requirements."

With Kuhn's long experience in show and corporate lighting

- ↑ There are around 80 exhibits shown at a time, rotated from around 700 models in storage

The bespoke spotlight designed for the museum is small, unobtrusive and aligns with the building's aesthetics

and Gregor Sgonina being a veteran of architectural lighting, a joint venture that amalgamated both applications was actioned. Zumtobel, as a manufacturer of high-quality lighting technology and German Lighting Products (GLP), as a specialist for moving lights came on board, being guided by a white paper specifying the project requirements. Together, a prototype was developed, successfully tested and approved under real conditions in the museum.

"What we have designed is an innovative spotlight that has 16-bit motorised positioning and a motorised zoom of 15-35°. Luminous flux is 6,000lm, and the fixture has a very accurate 16-bit dimming down to 0. The TM-30 value is Rf 90+/Rg95+, the TLCI is above 90, and it emits neither UVA nor IR. The specification is exactly what we were looking for in terms of output and functionality - and it looks great: small, unobtrusive and it aligns perfectly with the aesthetics of the building. Porsche, quite rightly, are very, very picky about the visual element, and these fixtures really tick the box."

"SIMPLE, BEAUTIFUL AND EFFICIENT"

As is often the case in long-term installations, the control system had to be user-friendly enough to cater for non-specialist in-house staff to operate. "When compared to the programming required for a live performance event, what was needed here was fairly basic. We looked at various options but kept returning to MA Lighting. A special app was developed that is essentially running a background LUA script that lies within the grandMA3 Replay Unit; a bit like working with macros, but much more powerful. All the functions of all the fixtures can be manipulated and updated on a single page of the app - exactly what we were looking for," says Kuhn.

The transmission of the control protocol (DMX) to the lamps is carried out with Data Over Power technology specially developed and patented by GLP in which the signal is modulated onto the power supply. The DALI-controlled downlights also receive their signal via the rails

after a conversion from DMX to DALI. Meanwhile, RDM helps to detect problems at an early stage.

"The end result is simple, beautiful and efficient; we have reduced consumption by a third yet provided double the output. That is without calculating the reduction in time and money spent on focusing manually and the reduction on heat output which, in turn reduces costs in air conditioning. I believe the partnering of two lighting companies from either end of the spectrum to develop the fixture is something of a first. Needless to say, the fixture will be commercially available shortly, as all the participating parties see a broad use for such a fixture. There is already talk of working on the next stage of the product: smaller versions, different colour temperatures etc . . ."

Both companies have seen the potential in the new Zumtobel/GLP Agilio moving head for their own markets, as Sebastian Gann, group sustainability director at Zumtobel attests: "With the 'rolling exhibits' in mind, a spotlight was developed that realised a long-cherished wish: the combination of light of the highest quality with the possibility of intuitively turning, aligning and adjusting the spotlight from the floor."

GLP's Ulrich Steinle concludes: "We are tremendously proud to be part of this project together with Zumtobel and Martin Kuhn. Our expertise with moving lights and Zumtobel's know-how have resulted in a wonderful and flexible product that can be used in many situations where it normally would not be possible to use moving lights. This is a really exciting development and shows how innovation for a single application can produce a new product that has potential across all sectors of the industry."

After planning and tendering, German production house Neumann & Müller was commissioned for the implementation in the summer of 2020, and the work was successfully completed this spring. ✕

➡ www.glp.de
➡ www.zumtobel.com
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Review: ISE 2021

Two small-scale regional events signal a tentative return for industry tradeshows. LSI reports . . .

[UK/Spain] This 1-2 June, Integrated Systems Europe signalled a step towards industry tradeshows making a full return as it opened at its new home in Fira de Barcelona for the first of two small-scale regional offerings.

In celebration, Integrated Systems Events' Mike Blackman lead a motorbike trip from ISE's office in Munich to Barcelona ahead of the opening. He was joined by riders from LANG AG, AVIXA and Fira de Barcelona, with the group making a stop in Geneva, where ISE was first held in 2004. "What a journey," Blackman exclaimed as he spoke to media representatives at the opening. "I'm not just talking about my motorbike trip over the past three days, though it did give me plenty of time to reflect. (...) I started thinking how things have developed, how ISE has grown, how we have faced down challenges and how we have finally landed here today at Fira Gran Via Barcelona, the destination of a journey that began for ISE 17 years ago."

He continued: "You don't need me to comment too deeply on our shared experiences of the past 15 months. The effects have been universal, and our heartfelt sympathy goes to all countries, businesses and individuals touched by it. (...) As ever, ISE provides the base for the community to come together again."

In an opening address, Blackman spoke in earnest about ISE's confidence in the Catalan market, with the show having launched a dedicated showcase area for local businesses. "Catalonia is positioning itself as the European AV hub and we want to be a catalyst in that development," he said.

ISE Barcelona's Catalan Innovation Zone hosted 20 local companies, including pro audio solutions manufacturer Amate Audio, retractable monitor specialist Arthur Holme, all-in-one live video platform Watchity, and virtual events startup MitisWorld. In addition



to the showcase, several Catalan start-ups presented their recent projects, in industries such as AR, VR, video games and smart cities. The presentations were open to attendees and were also broadcast live on ISE Digital - the event's online platform.

Over in the UK, ISE London took place at Evolution, Battersea on 23-24 June, allowing the UK-based AV community to connect in person once again. With infection rates in the UK higher than in Spain, there were a host of COVID safety measures in place at the venue, including temperature checks on entry, compulsory mask-wearing and social distancing, and designated traffic flows on the showfloor. Mike Blackman made a virtual appearance as he welcomed delegates to the London show, with visitors then treated to a small exhibitor showcase as well as a programme of talks. With a large networking area available on the showfloor, the show offered plenty of opportunities for catching up - and organisers hope the show's full return in 2022 will provide an even bigger stage for the AV community as the sector returns to full strength.

Here, we round-up a selection of highlights from exhibitors at both shows . . .



① The showfloor at Fira de Barcelona

Delegates attend a seminar at ISE in Evolution London

➡ Facing page, clockwise from left: Mike Blackman completes the motorcycling trip; the Equipson stand in Barcelona; the Shure UK team in London

LIGHTING & VISUAL

DATATON HIGHLIGHTS LATEST MEDIA SERVERS

Dataton's Spanish representative inWO demo'd the Swedish manufacturer's Watchpax media server series at ISE Barcelona, as well as the Watchout multi-display software for corporate AV, events, retail, projection mapping, museums, broadcast, theme parks, and theatre. The Watchpax 60 is a 2U server that supports uncompressed 4K playback, has a dual power supply as well as HDMI and SDI input, balanced audio, dual 10Gbit/s network and NVMe media storage. The model range offers from four to 12 outputs. Its sibling, the portable Watchpax 40, is also suitable for portable installations in addition to fixed and offers four 4K channels and 1TB for media storage.

Dataton's Watchout software, which celebrated 20 years in 2020, was also demo'd on stand. The Windows-based software is available as a free download from Dataton's website.

➔ www.dataton.com

NEW EQUIPSON AUDIO AND LIGHTING KIT

Spanish AV equipment manufacturer Equipson exhibited in Barcelona, highlighting its Work Pro Audio ENTAR Series - a range of two-way professional loudspeakers aimed at the installation and live sound markets. Equipson also launched a second new Work Pro Audio range - the IP65-rated NGS LX speakers. There are three models, including a subwoofer and two-way speaker with built-in LED lighting.

The manufacturer also unveiled a new FX engine for its LightShark lighting and media control hardware product range. This allows lighting technicians to create and sync effects on multiple parameters and apply different types of curves during each step of the effect. It is also now possible to position fixtures on a grid so that the engine can easily find them and apply effects at the right point in relation to these fixtures.

➔ www.equipson.es

KEEPING IT LOGICAL

AV consultancy Logical Solutions was on hand during



the London exhibition to discuss its range of technology services for lighting, AV, security and design and programming of control systems. The company's MD Kelechi Aofolaju also presented the *Designing a Touch Free Workspace* seminar, discussing how work environments can be set up in a more intuitive way to minimise touching or sharing devices, thus addressing any safety issues arising from the pandemic.

➔ logicalsolutions-av.co.uk

PANASONIC MAJORS ON 4K SOLUTIONS

Exhibiting in Barcelona, Panasonic introduced new projectors and displays, including three 4K 1-Chip DLP projectors and multi-touch 4K LCD displays. The PT-RDQ10 Series of 1-Chip DLP laser projectors are designed for entertainment, rental and corporate organisations, with the three models in the series ranging from 8,000lm to 10,000lm. An optional short-throw lens is also available for projecting in tight spaces. For its popular 50,000lm PT-RQ50K 3-Chip DLP projector, Panasonic unveiled a new short-throw lens, the ET-D3QW200 with zero offset, ideal for indoor experiential entertainment requiring immersive native 4K image reproduction at vast scale.

➔ business.panasonic.co.uk

VIVITEK MAJORS ON WIRELESS COLLABORATION

Vivitek presented its Novo ecosystem of wireless collaboration devices and digital signage systems. Designed as an all-in-one solution for corporate and education settings, the system's components - from digital



signage options, to the NovoConnect Launcher that instantly connects to devices without software installation - promise a hassle-free experience for those looking to eliminate cable clutter or overcomplicated meeting set-ups.

➔ www.novoconnect.eu

AUDIO

AMATE AUDIO

Part of the Catalan Innovation Zone at ISE Barcelona, Amate Audio showcased its latest loudspeakers, including the X212AF three-way line array and dual 18" X218WF woofer, part of the Xcellence series. Also presented was the X102FD point-source speaker for small- to medium-sized applications, with two 10" drivers, a 1.4" neodymium HF driver and a rotatable horn.

➔ amateaudio.com

SENNHEISER'S TOUCHLESS TECH

Sennheiser promoted its TeamConnect Ceiling 2 microphone. Similarly to the original model, it has patented automatic beamforming technology and combines the advantages of a boundary microphone and a microphone

array, making it an ideal solution for video and teleconferencing, as well as lecture halls and classrooms. The new model also boasts a priority zone (to highlight a particular area) and five advanced exclusion zones (to remove unwanted noise sources). In addition, the company is making its TruVoiceLift technology a free feature update for the mic to further improve speech intelligibility by allowing for targeted voice amplification.

➔ sennheiser.com

SHURE'S ECOSYSTEMS

Shure highlighted its Microflex and Stem ranges of AV conferencing solutions at the London show. Both ranges are designed to work in a variety of rooms and scalable applications. Whilst Microflex is a more familiar range having been released by Shure last year, the Stem ecosystem is a result of Shure's acquisition of Stem Audio. The new offering enables users to design a custom conferencing system through an online 3D design tool - from specifying hardware to ensuring vocal intelligibility across the exact room dimensions.

➔ www.shure.com



future tech

Pixel-mapping the sea

James Simpson predicts the shape of tech to come . . .

"If you installed a small tidal generator that collected energy from the movement of the water, you could power a small but tightly focused array of lights . . ."



As the planet tries to cope with one crisis, the much larger impending crisis of the deterioration of our environment is going to create some of the most ingenious and outrageous future technology mankind has ever invented. In the next few editions of *Future Tech*, I will share some of the interesting ideas coming about to help prevent climate change - and what that means for the lighting and sound industries.

COOLING THE SEA

The rising ocean temperatures are being used as evidence of man's impact on the environment. And whilst there are political movements to slow down and reverse the causes, a more interventionist solution has been invented to force the temperature of the sea back down again.

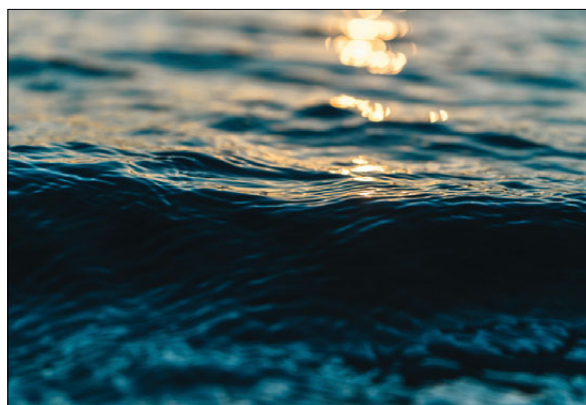
Whilst the oceans are warming, they are only warming on the surface - and by surface, I'm referring to the top 100m or so. This part of the ocean is the bit with fragile life living in it and that is affected by the natural currents of the sea that sustain our ecosystems. It is also the part of the ocean that touches our glaciers, causing them to melt and break off. Beneath this is cool water, filled with nutrients from the decomposition of sea life and vegetation.

PUMPING AN OCEAN

So how do you cool an entire ocean? One of the solutions being proposed is to put giant pipes tethered to the ocean floor at one end and pulled up by buoys at the other, to suspend them in the water just below the surface. They will be 200m long and anything from 3-10m wide with a flap at the bottom, which works as a one-way water valve. As the waves of the sea lift the tube up and down, it forces water up the tube from the bottom, emerging from the top as thousands of litres of water would emerge every few seconds.

A 3m wide tube could cool an area approximately 1.5sq.mi, 30m deep by 1.5°C (which is a 5% decrease in temperature), and it could do this in just one month.

This water isn't just cool - it is full of nutrients that are perfect for phytoplankton or algae to grow in. In fact, over the same area, more than 12,000kg of algae could grow which can capture nearly 800kg of carbon and increase the amount of fish by 120kg. These carbon sinks have the added effect of taking



carbon out of our air, as well as replenishing our over-farmed fish population.

A NETWORK OF PIPES

These pipes get placed at 1km spacings across large areas of the ocean in a grid that, if placed correctly, can also decrease hurricane intensities by reducing wind speeds by 15%, resulting in a 40% decrease in storm damage. Requiring no power, they are not providing any negative impact on the environment themselves, although scientists are debating if they may cause other devastating effects that we haven't understood yet.

A PLANET-WIDE SCREEN

The planet is vast and covering even a small patch of our oceans with this technology would be very expensive, although not beyond the means of any of the major economies. These devices haven't been designed to need or use power, but I can't help but think that if you installed a small tidal generator that collected energy from the movement of the water, you could power a small but tightly focused array of lights attached to the top of the tube. With the right application of wireless technology, you could pixel-map each of them, seeing as they are a regularly spaced grid of points.

I can't honestly think of a practical use for it, but wouldn't it be fun to programme up a planet-sized video wall? 🎮

James is a creative technologist and designer working in the world of digital theatre. He is a pioneer in the use of VR and AR in theatre and is trying to evolve the production design process with his research in design visualisation.



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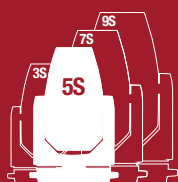
5 Series - Source
450 W - 6800 K

Lumens
18,000

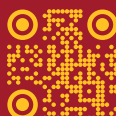
Zoom aperture
2° to 42°

Frontal Lens
168 mm

Weight
41.5 kg



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between the lines

Simon Duff reviews *Copenhagen Opera House*, by Richard Brett and John Offord ...

"The book provides technical background to an opera house that was set to become a benchmark for future design and planning ..."



Entertainment Technology Press continues to set the standard when it comes to books about stage engineering, lighting and sound. The publisher's title on the design and construction of the Copenhagen Opera House is no exception.

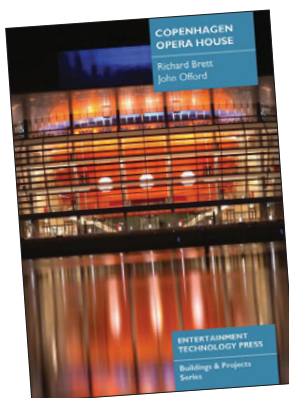
The building itself, a gift to the nation by Danish entrepreneur Maersk Moller and home to the Royal Danish Theatre of which Royal Danish Opera is part, opened in 2005. Designed by Henning Larsen, with Ramboll the consulting engineer and Buro Happold the sub-consultant, the building was completed in less than four years, its curvilinear shape with an overhanging roof giving it a ship-like design as it stands on the island of Holmen near Copenhagen city centre. Inside are two auditoriums, the main able to seat 1,700 people across its four tiers, along with an orchestra rehearsal studio.

Richard Brett, one of the book's co-authors, was the leading designer for Theatreplan, who were theatre consultants on the scheme. Also involved was Arup for acoustic design, along with UK lighting company Speirs and Major Associates, who designed the architectural lighting.

The book provides technical background to an opera house that was set to become a benchmark for future design and planning and features 17 chapters by relevant experts involved with the project plus technical summaries. The first few chapters are dedicated to initial project planning, pitches, the design phase and the role of the theatre consultant in the development of the auditorium. Brett gives fascinating insight into the level of detail that went into the early planning phases, revealing for example how as part of the acoustic design considerations, it was suggested that the energy coming from a singer on stage must not be immediately absorbed by the seated audience. This led to the creation of a raked stage, which allows the energy to build in the space like in historic theatres. This principle had to be re-understood by learning from the failures of some modernist designs from the 1930s to 1950s.

The main auditorium contains three tiers, with an extra tier for technical above. The book goes into detail on the need for a high ceiling, required to deliver a large acoustic volume. The seating was based on a standard seat from Race Seating UK Ltd, the row to row spacing striking a balance between comfort and the overall scale of the house. A chapter is also dedicated to the design of the rehearsal space.

Chapter seven goes into further detail on the full acoustic design of the building. Arup worked alongside the architecture and design teams to create a modern auditorium with a traditional horseshoe plan form to the balcony fronts. The acoustic design for the room focused on providing adequate reverberance for larger-scale operas, such as by Strauss and Wagner, whilst retaining excellent vocal intelligibility for the earlier Italian repertoire. The design target was to achieve an occupied mid-frequency reverberation time of 1.5 seconds, with an early decay time of



80-90% of this for sources on the stage and 90-100% of this for sources in the orchestra pit.

To reduce the reverberance in the room for an electronic repertoire and create conditions more suited to amplified sound, the auditorium was equipped with extensive areas of retractable sound absorbing banners that extend down the wall behind the seating in the second balcony and from the third balcony upwards. Upon building completion, detailed room measurements were made in the unoccupied auditorium; the average mid frequency reverberation time is 1.55 seconds unoccupied and 1.4 seconds occupied. Jeremy Newton from Arup, author of the chapter, explains: "Listening analysis in the auditorium offers a well balanced, warm, clear sound. The

presence of the sound from the stage is very good, particularly towards the rear of the stalls and in the balconies. Tonally, the sound is very beautiful, lacking in harshness and supported by a rich bass. The absence of noise provides the foundation for the conductor to exploit a great dynamic range."

Other stage engineering systems covered in the book include the design of the orchestra pit, the cyclorama system, and the elaborate stage wagon design used for moving scenery. The stage lighting system was designed by John B. Read along with John Whitaker and Richard Brett. The lighting gallery has DIN back-to-back channels with Danish standard luminaire mounting sockets within them at half-metre centres. Although the over-stage lighting used by the Royal Theatre was expected, because of their repertoire, the facility of being able to hang lighting frames in any position was provided, allowing for flexible designs of visiting productions.

In a similar manner, the book covers lighting control, power, dimmers and systems networking, and there is a chapter on architectural lighting written by Jonathan Speirs and Keith Bradshaw from Speirs and Major Associates whose commission included the exterior of the building, the main foyers, the main auditorium and the orchestra rehearsal room.

The final chapters give further insight into sound technology, with the choice for a centre-cluster sound system formed by an L-Acoustics ARC system with a Yamaha PM1D the FOH console, placed on a mobile dolly with five connection points. Also explained is the reverb foldback system used on the main stage, which uses 1029 Genelec loudspeakers and two Axyx line arrays, with Crown PZM microphones for the singers.

There's also detail on the design of the organ, supplied by the Allen Organ Company. The instrument was possibly the largest digital organ in Europe at the time, its 128 speaking stops, four manuals and pedal and its vast specification allowing the organist to perform music from virtually any period in history, from pre-baroque to contemporary.

This is a fascinating book that offers invaluable insight across a number of professions engaged to bring a landmark cultural building to fruition, and a must for anyone serious about learning the ins and outs of theatre architecture and engineering. ☘



classic gear

London Hydraulic Power Company | by Rob Halliday . . .

→ This is one of those classics that's bigger than our industry, though our industry certainly relied on it. You can think of it as water, you can think of it as a network of pipes sitting just below the streets of central London. The magic is the two together: the network of the London Hydraulic Power Company, which took water and put it to work.

Clever engineers had long used steam power to compress water which was then used to drive machinery such as dock cranes. It worked well, but needed the space for a steam engine. In 1871, Edward Ellington hit upon the idea of building a central steam engine and pumping station near Blackfriars Bridge, feeding a network of pipes that took hydraulic power to wherever it was needed around the docks. In 1883, an Act of Parliament merged Ellington's company with a younger rival to create the London Hydraulic Power Company.

From then until the outbreak of World War II, the company's network grew, ultimately spanning Hyde Park in the west to the docks in the east. Four more hydraulic power stations were added, in Kensington Court, Wapping, City Road on the Regent's Canal, and at Canada Water in Rotherhithe. Originally coal-fired steam engines were used to pressurise the water to about 800 pounds per square inch. The distribution pipes, originally hessian-wrapped cast iron (6" diameter pies with 1" thick walls), later steel, ran just below the surface - leading to spectacular geysers when they ruptured. The network criss-crossed the Thames, at Vauxhall, Waterloo and Southwark Bridges, via the Rotherhithe Tunnel and taking over the underused pedestrian Tower Subway. At its peak, 180 miles of pipes carried up to 32 million gallons of water a week, pulled in from the Thames, filtered, even heated in winter to avoid it freezing (helpfully melting snow on the streets above). The network could deliver a total power output of about 5MW. Like any utility, each user had a meter to record their usage; in many cases, it was cheaper than electricity.

Theatres were amongst the many industries to love its clean, quiet power. It lifted the safety curtains of many of the West End's theatres (apocryphal, if unconfirmed, stories talk of safety curtains across London descending in unison if there were issues with the supply). It turned the revolves at



↑ The London Hydraulic Power network in London; the pipes being installed beneath the streets

the Coliseum and the Palladium. It raised Leicester Square's cinema organ. It powered the front two stage lifts at the Theatre Royal Drury Lane, a giant piston at each end of each bridge allowing them to be independently lifted, lowered and tilted.

The Blitz caused much damage; afterwards, demand fell as heavy industry moved out of the city centre. The network started replacing steam with electric power, but users were finding they could often switch to electricity themselves. In June 1977, the network was finally shut down. At least one theatre, the Lyric, retained hydraulic power for its safety curtain, instead driven via an electric pump.

There is value in everything, though, if you're canny enough to realise it. Though the buildings were largely abandoned and the pumping equipment went for scrap, that network of pipes (and of the London Hydraulic Power Company's legal right, as a statutory authority, to dig up the roads to maintain its network) would have a new life in a new era. It was bought by the Rothschilds for £1.2m in 1981, sold four years later to Mercury

Communications, who threaded fibre optic cable through it - powering the city in an entirely different way. ☺

London Hydraulic Power Company:

▶ [//plasa.me/subbrit](https://plasa.me/subbrit)

▶ [//plasa.me/lhphistroy](https://plasa.me/lhphistroy)

The Drury Lane Lifts:

▶ [//plasa.me/royaldrurylane](https://plasa.me/royaldrurylane)

Rob has been working in and writing about lighting for almost 30 years, on shows around the world.

He wonders if this makes him a classic... or just old!



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Rarely has a live TV broadcast event been so eagerly anticipated - and taken so long to actually arrive. In spring 2020, the final pre-production meeting for the *Eurovision Song Contest* (ESC) was about to take place. ESC's head of production, Erwin Rintjema, says he was "in the middle of that two-day meeting where everything was being finalised prior to a 2020 load-in when the Dutch government announced shutdown throughout the Netherlands. It was so bizarre; almost every truck was loaded and ready to go. It is difficult to describe how we all felt."

It was fitting that *Eurovision 2021* was chosen to be the first large-scale show with a live audience (albeit at a reduced capacity) to be piloted as a Netherlands COVID-secure event. With the floor of the arena designated as the green room area for the delegate parties, the public audience of 3,500 was located on tiered seating. Beyond the confines of the Rotterdam Ahoy, the contest was watched in 234 countries with a TV audience of some 183 million. Social media engagements during the event racked up over 14 million, whilst YouTube has recorded five billion watches to

date. Whatever your take on the event, the numbers speak for themselves: *Eurovision* has ridden out the COVID storm and arrived back with an almighty bang.

Rintjema explains the timeline since lockdown in 2020: "After last year's postponement, we immediately started planning how ESC could happen in 2021; we were all determined that it would go ahead in one form or another, somehow. We came up with four possible scenarios: the ESC exactly as we knew it pre-COVID through to the other extreme - a much-reduced event without audience, without delegations on-site, and without live performance. The middle two possibilities were varying scenarios that sat between those two extremes, but we were adamant that it would happen no matter what."

He continues: "Of course, from a production point of view, those variants pose more questions than they answer: how big or small could the audience be; how many delegations could be present; how many in each one; could the grand finale be live while the semi-finals be



Europe's flamboyant song contest dazzled millions of TV viewers as the production team realised an ever-evolving show to a strict design and safety brief. Kate Lyon reports . . .

remote? The erratic nature of the virus was a concern as well. We might be COVID-free here in the Netherlands, but not in other parts of Europe - and that has been born out over this last year.

"So, production planned an event that could host all possible scenarios using a single arena layout, a single set design with associated visuals, and audio design. The maximum number of each delegation was reduced to 20 and we doubled the size of the delegation bubble and artists' green room on the arena floor to ensure social distancing. We also moved the stage downstage by a few metres to increase our backstage area where we have quite complex COVID-secure protocols for getting artists mic'd up and ready for the stage, as well as space for stage crew to do changeovers in a secure fashion."

He continues: "However, this has meant that everything front of house had to be reconfigured. Just from a rigging perspective, we have over 500 Lodestars in use, so it's easy to see how much had to be shifted to match the new

stage location, although we are lucky that the Ahoy has so much rigging capacity both in load and location. But this has meant we could be flexible with which version of ESC would be possible this year without having major last-minute changes; that has proved a vital part of pre-production. I can talk to our suppliers and change specifications throughout the pre-load-in period from December through to February, even March, but I can't change the template of the venue - it has to remain a fixed setting.

"This has proved to be the most important decision we made all those months ago before we all recognised what an unpredictable beast COVID was going to be. For example, we only had confirmation that any sort of live audience would be allowed a few weeks before the show, but we were able to accommodate that in terms of sound, lighting, audience entry, testing, social distancing, etc. Health and safety is always high on the agenda at ESC, but this year it has necessarily occupied us more than usual. From load-in to load-out, all our crew have worn masks



Photo: Ralph Larmann



Crew photos: Nathan Reinds

From top: Erwin Rintjema, head of production

Head of live sound Jeroen ten Brinke (left); Falk Rosenthal of Gravity (right)

Set designer Florian Wieder with LD Henk-Jan van Beek

and been driven by dedicated shuttles to and from hotels and the venue. We have timetabled the setup to ensure social distancing wherever possible. There have been, of course, certain times when crew have to be at close quarters, but we all take tests every 48 hours and the results are linked to our accreditation system through our communications supplier, Riedel Communications, and in conjunction with the Dutch government, who are using this as a Fieldlabs pilot event."

The Rotterdam show was very much a Netherlands-based event with much of the hardware coming from veteran ESC supplier Ampco Flashlight after an extensive tender period (for the anticipated 2020 show). Although the TV audience or the ESC far outweighs even the pre-COVID capacity crowd of the Ahoy, the creative teams never shy away from designing a production that, at its heart, is a live event.

AUDIO

Head of live sound was Jeroen ten Brinke. The FOH rig from Ampco Flashlight featured L-Acoustics gear with K1s naturally taking the lion's share and KS28 as the major supporting sub. The green room was covered by K2s and Kara cabinets. "The design hasn't changed since the first plan in June 2019," explains Ten Brinke. "The central green room on the arena floor has small local speakers built into the couches, so that alteration from the original wasn't an issue. Our PA is flown in six main clusters on 36 hoists with the seven fill arrays on a further 14 points. You can see how much hardware is hanging up there, but we only needed to tweak a few of the arrays closest to the stage to escape some possible clashes with moving lights."

When asked about acoustic challenges from the extensive LED screen layout or anything else, Ten Brinke is frank: "For a show as visual as ESC, these sorts of issues are commonplace. For instance, I looked at several different PA systems, but L-Acoustics is the only one that has 'shower safe' written into its manual - and I don't think there is an effect available that isn't being used here. The Ahoy is like a second home to me; I am here for several productions every year, so I know answers to these sorts of questions. A few years ago, we turned the whole PA 90°, which made it easier to control SPL and spectrum where most of the audience is. In a few years, we'll see this more often, I guess."

The console of choice for performances is from DiGiCo, which Ten Brinke calls "a universally-trusted desk with double engines and power supplies that make it the most reliable machine in the world with the right operators." For the speech segments, he opted for Yamaha - the CL1 plus Rio.

The delegates bring with them a team of eager creatives. How close do they get to the DiGiCo Quantum 7 consoles (FOH and monitors in one loop, one main, and one backup loop)? "They don't! They bring their own engineers, but they are not allowed to touch a knob," says Ten Brinke. "They get an IE pack at the most. As far as outboard processing is concerned, I skipped the lot. What we have onboard is more than enough. It makes it all safer and less work all around - and it means everyone is on an equal footing."

COVID security meant a great deal of thought and planning went into handling in-ear systems and handheld mics. "I am

not entirely sure that Shure ever field-tested their handhelds for pandemic conditions, but they held up really well with all the head cleaning and extra turning that they had to go through. We did wonder if they would start to fail after a time, but they are a quality product with robustness built into the design." The Shure Axient system included 20 Axient Digital AD4Q four-channel quad receivers, 20 Axient ADX2FD handheld wireless microphone transmitters, including ShowLink remote control and 70 P10R+ diversity body-pack IEM receivers.

Beyond the confines of the Ahoy are the millions of viewers receiving their sound from the broadcast team. "Thijs [Peters, head of broadcast sound] and I worked closely together. We try to serve the entire TV production - the aim to have both a great live show and perfect TV show sound. It is great to be able to make a design with zero delay lines. Very often, doing audio for TV in an arena can be a disappointing sound experience for the live audience - but not this time!"

SET DESIGN

Designing a visual platform for an event of this nature requires a particular skillset: how does one create that big look, essential for projecting the ESC ambience in all its glory, while providing enough flexibility to accommodate so many

different creative aspirations - acts from heavy metal to pop through to intimate ballads? Florian Wieder is a proven veteran of this kind of challenge, including previous ESC productions. "For this show in Rotterdam, there were several of us considered and I was honoured to accept the offer," he says. "I always try to reflect the essence of the host country, wherever that may be. That is one of the most interesting things about this show: for each host to have the opportunity to showcase its own character and culture."

He continues: "I am quite familiar with Dutch culture and history; the obvious facets of the Dutch landscape seemed a good place to start my planning. It is famously flat, closely connected to water, soft waves and canals - they are the obvious signposts in the clean-cut runways of the stage. There were more in the original design, but some compromises had to be made to allow for the green room changes. The more implicit design ideas work around the almost infinite looks that the delegates want to impose on the stage while simultaneously creating a strong generic *Eurovision* look. Here in the Netherlands is what is universally recognised as 'Dutch Design.' It is extremely functional, understated, with a clean and almost minimalist feel while maintaining the visual

"It is extremely functional, understated, with a clean and almost minimalist feel, but it hides reveals, movements, and transformative tricks that allow for those 'big' moments that ESC demands . . ."

- Florian Wieder



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Photo: Nathan Reinds

aesthetic, and I guess that is a good way to describe my design. It initially appears as clean and simple but it hides reveals, movements, and transformative tricks that allow for those 'big' moments that ESC demands."

Wieder shows a practical understanding of how the set must work to facilitate the logistics of multiple changeovers - not something universally considered by set designers. "There are teams of stagehands working constantly: one setting up for the next act, others clearing the stage and moving set pieces to make room for the next performers' accessories. It is one of the backstage manoeuvres ESC is famous for - the changeover is a really tight 40 seconds. The central parts of the main LED screen are placed on two turntables built into the stage, allowing them to open as a doorway. This has more than a single function. It helps to support these changes, but it also offers the delegates a whole alternative visual aspect, as [lighting designer] Henk-Jan has a whole wall of lighting behind it. In addition, it supports this year's ESC mantra of *Open Up* - it is an inviting, welcoming gesture."

The sometimes uncomfortable partnership of designing for a live show and TV simultaneously is a challenge that Wieder relishes. "A stage is a stage and, in effect, only offers a single perspective for the TV director. So, the B stage is not designed simply as a thrust but as a concept that provides variety both for the artists and different and interesting angles for the TV crew. The extra LED screen can fly in at a parallel angle to the B stage, in effect creating a whole new platform and set of perspectives for the TV directors to work with - almost like being transported to a different venue if you're watching on the small screen." The arena floor was also part of the Wieder's design remit. The green room semi-circular seating created suitably socially distanced pods for the delegate parties and provided the TV cameras freedom to access the party atmosphere that is an integral part of the ESC ambience. "Essentially, I used the delegates as a replacement audience to remove a great deal of potentially negative space.

"There is a danger to allowing continually huge, overblown looks for every performance as every delegate wants to outdo everyone else; beginning with such a simple, pure look enables each artist to create an individual visual rather than a 'bigger' one. As well as working with the lighting design and the AV content on the LED screens, we have used augmented reality (AR) to create some memorable TV

looks. It is a really interesting tool but very complex to use successfully: any mistakes are so obvious as the integration of lights and AV content with AR is a delicate process. On this show, I have been fortunate to work with a long-term collaborator, Falk Rosenthal, of [Hamburg-based] Gravity, for LED screen and AR content, who will no doubt tell you more. If you add the huge amount of movement in the lighting rig, the Black Quartz B4 screens and not forgetting the Black Marble BM4 LED floor from ROE Visual, the set is able to offer almost infinite possibilities to the delegates without losing that baseline ESC look. That reality has come courtesy of some magnificent teamwork: as well as working with Henk-Jan on the lights and Falk for the AV and AR content, I have to thank Cuno von Hahn as set designer and Per-Arne Janssen as art director. Between us, we have been able to offer audiences in the Ahoy and across the globe a real feast for the eyes."

AV AND AR VISUALS

"Florian is a great creative and inspiring sparring partner," Rosenthal opens, "and when you've worked in a creative process together over many projects, it's much easier to get the direction of what somebody's thoughts and intentions are. Our design process has roughly three phases: every country has to present its songs and visual concept by mid-March. From there, we do the first creative layout for every performance. This is sent to the director, LD, and production for discussion, which results in some revisions and refinements and a rehearsal-ready version, which is presented to the delegations using stand-ins. Finally, we rehearse onsite, making those last tweaks and adjustments until showtime."

He continues: "Doing shows like *MTV VMA*, and *EMA Awards*, as well as what will be our seventh *Eurovision*, means we have become very experienced in taking those initial ideas and translating them into a three-minute version of the performance. It is important to get this draft to the LD as quickly as possible, so they get an idea in their pre-programming of what we are creating (complexity, theme, colour, vibe, and style). As soon as screen content and lighting are combined, we start discussions with the multi-cam directors Marnix Kaart and David Jelinek. It can be nerve-wracking but is still so exciting at the same time."

The constantly-evolving nature of lighting versus AV content is clearly an important part of the whole jigsaw. "Is content important or lighting? Sometimes we stand back or even stay

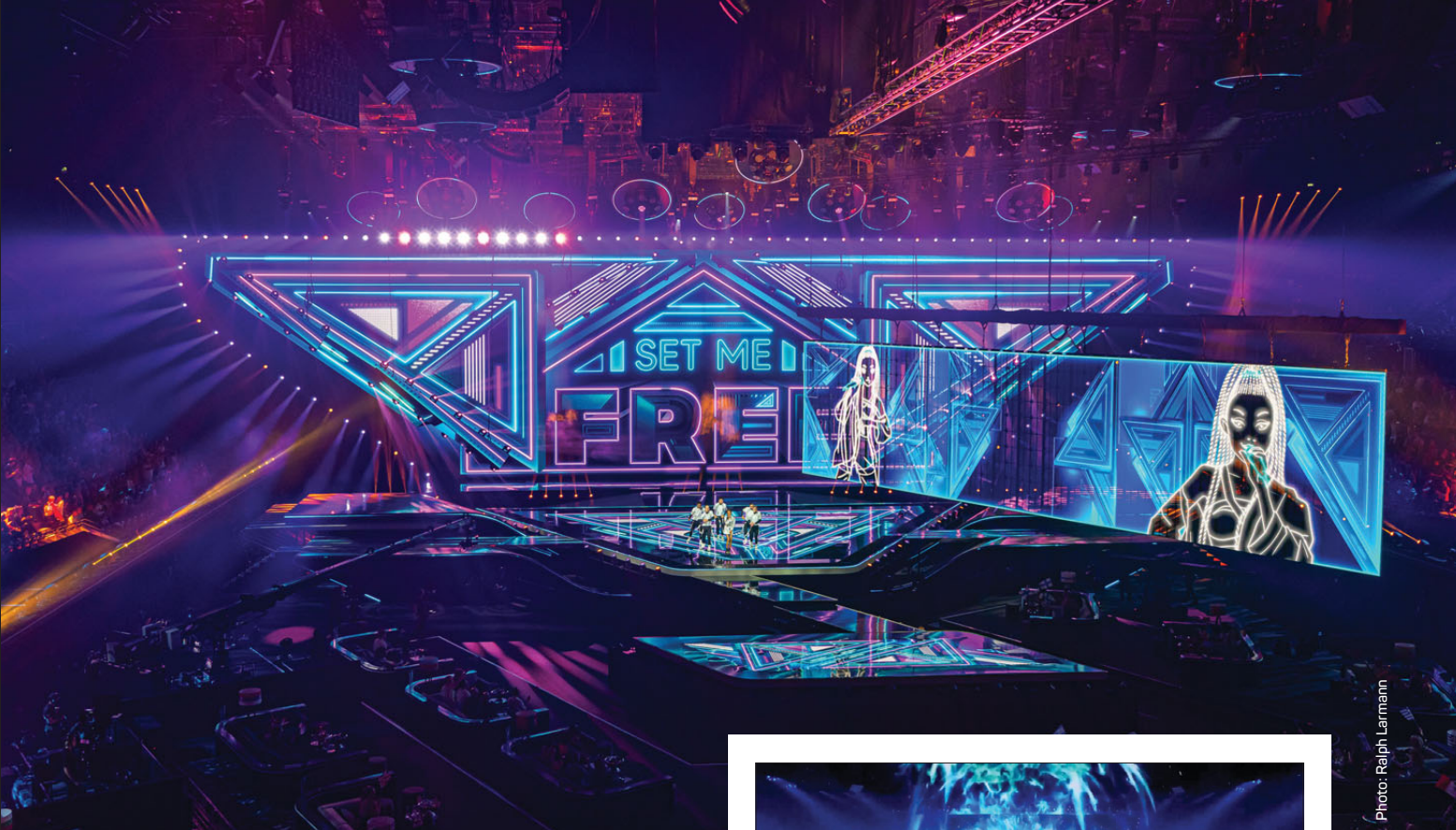


Photo: Ralph Larmann

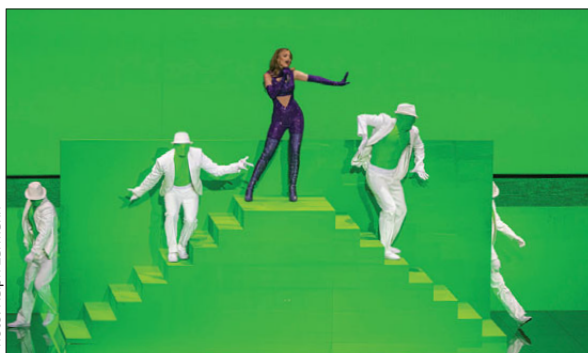


Photo: Ralph Larmann

black and make it just a lighting look. But, for most of the openings, it's good to have a strong visual and use lighting to complement this look and concept. When the camerawork steps in at previz and rehearsal time, it's up to every department to clean things up and throw things out so we reach a sharp and condensed visual experience for each delegate."

Rosenthal has no doubt that AR is here to stay at events that have the infrastructure and the budget to deliver it. "The implementation of AR is the next ingredient of what we will see more and more in future productions. This wasn't the first time - in Israel [in 2019], we did AR as well. Rotterdam was the next step in pushing things forward and I'm pretty sure it will have its influence in the next generation of more immersive show events. AR is a highly integrated and previsualised process where we simulate everything in the pre-production process, including lighting, and every department tries to follow that design as close as possible on-site. For the flag parade opening with the virtual tiny houses, we did a complete previz in Epic's Unreal Engine with virtual cameras/virtual DMX lighting/virtual wet and - last, but not least - the actual screen content, all timelines and music sync'd. In the end, it was so close to what you get on TV that you could barely see the difference between pre-production and the final result. NEP and EMG provided the multi-camera facilities, and NEP the AR infrastructure."

The virtual lights in the AR were controlled by several Art-Net universes. There was also a connection with the disguise media servers to control the intensity of the LED screens and even use the lights around the LED screens as an 'ambilight' effect.



↑ AR content was highly integrated in the show, with traditional lighting used to complement the visuals and virtual lights controlled by Art-Net universes completing the looks

Over 900sq.m of LED screens were used, the main screen being over 500sq.m alone, and LED flooring integral to the show-stopping visuals



Photo: Ralph Larmann

Rosenthal continues: "There is no doubt in my mind that AV and AR are where entertainment visuals are heading. Sometimes the focus is on lighting, sometimes screens are taking over and doing all that work and telling the big stories, but in the end, it's about the artists and their intentions, not lighting nor screen content. For the moment, you need both to make a stage come alive."

Looking after the hardware for Rosenthal's dynamic content was head of event video and media servers Hans Cromheecke. "I have worked with exceptionally large screens over the last 30 years but what we have here at my eighth ESC is showing LED screens at their best. The [ROE Visual] Black Marble BM4 floor covers both the main stage at just over 127sq.m and the B stage (27sq.m) but that is just the start; the main screen is 508sq.m of Black Quartz while the fly-in or runway screen is made of transparent [ROE] Vanish 8. If you add in the truss covers, the audience screen, and extras like the DJ booth, it comes to over 900sq.m."

A veteran of ESC, Cromheecke is all too aware that the result is always in favour of the image on the small screen. "It can be like a crazy circus 10 minutes before my first show," he says. "This is not for the 20,000 audience here but for the millions at home - they will be watching so make sure you get it right!"

Cromheecke continues: "There were 16 points to fly eight LED screens. The main screen was suspended on rails with the central part standing on two massive rotating dollies that allowed the screens to open like a pair of doors; imagine a rotating door weighing six tons, 6m wide and 12m high, able to move 18° left or right at high speed. Faber AV did a great job, supplying exactly what was required for each different application. Opting for disguise gx 2c and vx 4 media servers was a no-brainer: easy LED canvas mapping, multi-timeline, perfectly sync'd timecode, fully redundant, multi-user . . . I could go on. Essentially, disguise is the only thing I would choose for an event of this scale and with this complexity of content. Having the very best equipment in terms of delivery and reliability makes my life much easier. For the whole video department, we had about 20 people onsite during event days, making sure every box was ticked, from operational positions to internet feeds to media servers."

LIGHTING

It may be a music contest but without the imagery to overload the senses *Eurovision* would not satisfy what the audience - or

the delegations - are expecting. To light the entire venue, LD Henk-Jan van Beek used somewhere in the region of 1,800 units on innumerable trusses, set pieces, and drop arms above the stage areas and around the bleachers. A stalwart of many major music awards and big broadcast events, including the *Junior Eurovision Song Contest* in Rotterdam in 2007, this was Van Beek's first full-scale ESC. "I was the consulting LD for the Dutch delegation at ESC at Kiev in 2016, so I knew about the scale of the event; it was an honour to be asked. I was given the freedom by the executive team and Erwin Rintjema to create a distinctive and different ESC look. Together with set designer, Florian, and head of AV content, Falk, we set about creating a new dynamic visual presentation for ESC."

"After an elaborate official European tender process, we were more than pleased to find out that Ampco Flashlight was awarded rigging, lights, and audio," says the company's Marc van der Wel. "This is a novelty in the recent history of the ESC. To live up to the expectations, we combined the experience which we assembled doing rigging and lights in Portugal in 2018 with our extensive audio track record on the crossroads of broadcast and live music events. The first remarkable moment for me was the first semi-final because it was the first time in over a year that we had an audience. The second was the grand final because it was, again, flawless."

"The cooperation between all the departments meant that we were able to incorporate all facets into a single design plan that was perfected during the previz period and then the production period once we were in the Ahoy," adds Van Beek. "The design was essentially the same as the 2020 concept; on my part, we just had to accommodate the stage being moved and replacing the audience with an enlarged green room instead. It wasn't until March that we knew there would be a real audience of 3,500, but the anticipation of having a live audience outweighed any re-design tweaks that needed to be made."

The team used the Capture previz software system together with CuePilot, the cloud-based application that allows several users to work on the same project and its acts in realtime. Van Beek explains: "Lots of big truss motion was planned in this big and open set design to make the looks more intimate or giant, depending on the requirements of each song, so the previzualisation was a really vital part of the process; we could not have achieved this result without either Capture or CuePilot."



Photo: Ralph Larmann

"I am proud that we were able to come up with a comprehensive and well thought through COVID-protocol, designed to keep us all safe ..."

- Erwin Rintjema

Delegates delivered their ideas and then we translated them; one of our team was designated as the liaison officer to keep communication channels as clear and transparent as possible."

It would probably be quicker to list the fixtures that Van Beek *did not* specify: show units were mainly Robe Spiiders and Beam150s along with an array of Claypaky and Ayrton gear. "We had some great new fixtures such as Claypaky Xtylos as effect lighting and the Ayrton Húrcan-X as key light. The Xtylos because of the great straight lines matching the set design and the Húrcan as a fabulous workhorse with a powerful white LED engine and great effects, gobo wheels, colours, and blades - we used every feature of it. We also needed the power of both great tools to match the LED wall output. The Robe LED Beam150s because of their size and powerful output and the Robe Spider for the special pods (with nine of them on each one), for output, colour, and zoom range and to be able to use the separately controlled LED engines with combined parameters. That huge upstage LED screen also had 140 Ayrton MiniPanel-FXs, with mirrors attached to the reverse of each fixture, embedded into the rear of the screen for when the central [upstage] doors were rotated."

Two different automated followspot systems were used: Robe RoboSpots with BMFLs were used as front spots for great output and accuracy; 58 Huracán-X fixtures were calibrated to a Follow-Me tracking system and used as key lights and followspots on the artists. "This gave us and the TV cameras a huge number of options. Through PosiStageNet (or PSN), the Follow-Me was connected with the motion control system so that the followspots remained perfectly on target while parts of the rig were in motion."

All the lighting control was done through 14 grandMA3 desks: 10 on FOH; two on the floor for focusing and two in a studio for offline programming. There were 32 Active Processing units (PUs): 15 for the main show lights; two for key-lights, and remote followspots while the final 15 were for set, specials, LED lines, AV, CrowdLED wristbands, delegation specials and smoke machines. To complete the numbers, the production made use of approximately 7,000m of fibre cable to transport 305 sACN and 37 Art-Net universes around the venue.

"I was really pleased with the end result, both from a live and a TV perspective," reflects Van Beek. "Lots of output with fixtures hung out of sight, preserving Florian's clean look and with lots



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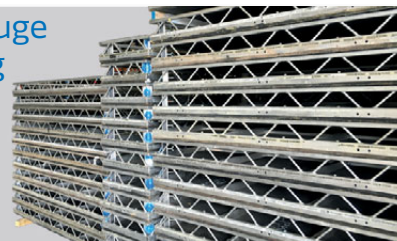
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Photo: Ralph Larmann

of motion to continually renew and refresh the whole vista. To achieve big, arena-wide looks and offer great TV broadcast shots has been a challenge but, as always on these huge events, it was down to a great, sparkling, collaborative cooperation between us as creatives, the multi-camera directors and the TV production team."

That figure of 183 million TV viewers is necessarily the deciding factor in which visual medium is the winner in the live-versus-TV debate. Multi-camera TV directors David Jelinek and Marnix Kaart worked with 24 cameras: 20 for the performances and the show, three down in the green room, and a single, big venue camera.

"From January, we started working with the creatives from each country along with the rest of the creative visual ESC departments," opens Kaart, "But even that amount of time doesn't give us a lot of margin for changes and unforeseen issues. For big shows like this, working with CuePilot and Capture together is my preference; you can see very clearly exactly what you had in mind for a particular shot and it gives you confidence it will work live. I can see exactly where the light effects are and how that affects the content for the camera, so I can script in the wide shots or specific close-ups. But it takes time. To put one CuePilot file in Capture can take a day; with easier scripts, we can do maybe two songs in that time."

"We worked with CuePilot for all the acts," continues Kaart. "But all the rest - the voting, the host and green room - were all live edits. Of course, there was some reprogramming there but that is more a matter of frame changing than shots and in CuePilot that's an easy task. Despite that small audience and the extended green room, we managed to avoid showing 'empty' spots or 'negative space' as Henk-Jan and Florian refer to it.

"It has been an amazing journey; I don't think there was a day in the last two years that I haven't thought about this show. The first dress rehearsal was really the first time we all came together and there were zero mistakes, which says a lot about the value of pre-production and programming time. Even for those of us who have many years of the 'big stuff' under our belt, we knew we were doing something special - I am proud to have been part of it."

Falk Rosenthal aptly sums up the ethos for the creatives on ESC: "I think it's essential that if somebody wants to win this competition, everything has to be perfect. When we go back in time, every winner's performance was perfect on its own, including their visual and audio approach, which 100% sets the canvas for the artist and the song. You need to create this unique magic which sets you ahead of the competition, and make this

moment an unforgettable performance. That's what makes our job so responsible and exciting at the same time - and, in the case of [the winning act] Italy, we felt this magic come to life!"

Rintjema adds: "From a production point of view, this has been an intense but very successful and satisfying event. Of course, the COVID-19 pandemic put a big mark on the whole production. But I am proud that we were able to come up with a comprehensive and well thought through COVID-protocol, designed to keep us all safe. And it worked! Crew, staff, artists, and press all stepped up and followed our guidelines, resulting in an extremely low number of infections discovered in our dedicated testing facility and we were able to prevent these spreading through the production. We owe a huge debt to our health and safety team.

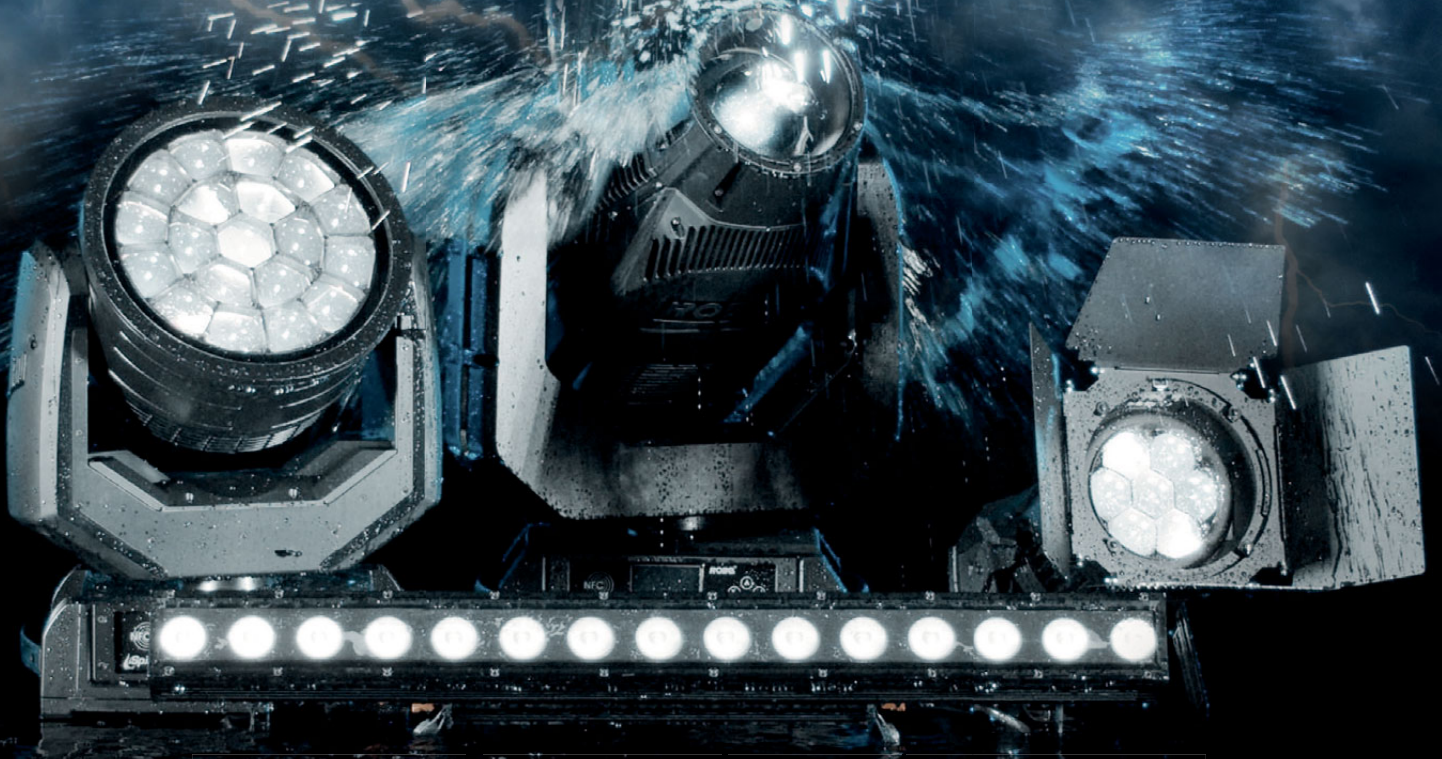
"On the more conventional production points, all the systems worked flawlessly; we had no big worries from a technical point of view at all. It's no surprise that the delegations pushed us to the limit when it came to their performances; this is where *Eurovision* stands out from all other productions. We shared information on the possibilities of our stage, set, motion items, special effects, etc., much more than in previous years. And, well, we got what we asked for! They went all out with their creative ideas, and we tried to turn as many of them into reality as possible, stretching the possibilities of our multi-camera and lighting/video departments and crew. There were certainly moments we asked ourselves, 'Why weren't we stricter from the get-go?' But it really all came together; we are so proud of the end result."

Speaking of some of the memorable performances of this year, he says: "So many dynamic performances on one stage: wow! There are far too many to mention, going from a giant inflatable moon for Spain through a huge moving mirror and burning letters for Cyprus, a green set of stairs and walls for Greece, all the way to giant trumpets for the UK!"

Rintjema concludes: "I cannot finish without a huge shout-out to our stage crew and a word about the infamous *Eurovision* changeovers! At times I drove our stage manager to madness with all the ridiculous ideas that we allowed onstage and the speed at which all the changeovers had to be made. But he nailed it! With a huge crew of 35 they pulled it off. It's been a great adventure, and the feedback both from the event industry in the Netherlands and all the participating countries has been extremely positive. So I can only be happy and proud at what we have achieved here against all the odds and challenges of the past year!" 🎉



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Chris 'Showfile' Harding, audio wrangler of varying talents

"Proudest moment? Mixing my first arena show after the head of music at my high school told me I'd never amount to anything . . ."

Name, Age, Job?

Chris 'Showfile' Harding, 35, audio wrangler of varying musical and corporate talents, PM and moonlighting button-pusher in other capacities.

Recent Activity?

A charity fundraising event for techs run by SubFrantic. I mixed broadcast, comms and half a dozen or so IEMs on a PM10 at their lovely new studio.

Worthy Past Glories?

I've done a lot of monitor systems and had the chance to mix or sit side-stage for a lot of incredible acts like Tom Jones, A-ha, Sister Sledge and The Proclaimers. I've mixed FOH for Nelly, Bonnie Tyler, Katrina and the Waves, ABC and I've been the PM and FOH for Go West for the last few years. I once mixed Ed Sheeran in a gazebo a few years before he broke, as I imagine many did. I've done a lot of corporate as well, the most awesome stuff I can't talk about because of all the NDAs I've signed!

Why are you what you are?

It's weird, because as a young child, I used to scream when my dad put his music on - I mostly hated it until I got to high school. By the time I picked up the guitar when I was 15, I was hooked. I wouldn't get into the serious side of live engineering until after I'd spent a decade performing, running workshops, producing records, and mixing small gigs. Once I started freelancing for a few mid-sized PA companies, I met a few larger production houses going in and out of warehouses for various clients, and before long, I was fortunate to learn loads of different skills and ended up working all manner of crazy corporate and musical adventures as a result.

Three best things about your job?

Meeting so many incredibly varied, hugely intelligent and kind folk. Getting to dream up mad solutions to lots of fascinating problems. Travel and seeing lots of amazing places.

Two worst things about your job?

It can be stressful, tense and emotional at times, never mind working and sleeping in all weather. People who waste

energy being angry rather than focusing on fixing the problem.

Detail the equipment you use?

I've used lots of wonderful, confounding or awful things and the gigs always happened. So long as it actually works, and is capable of the task at hand, we've got a show.

Most crucial invention since you started?

Facebook - for networking, if nothing else.

Proudest moment?

Mixing my first arena show and reflecting on a lifetime working in the music industry after the head of music at my high school told me I'd never amount to anything was a good feeling. It's that, or becoming a gif . . .

Best gig while working?

Having a BBQ backstage on the beach at Oceanfest whilst doing monitors is a fond memory.

Best gig as a punter?

System of a Down at Leeds.

Biggest nightmare on the job?

Too many jobs, never quite enough time.

Most irritating request from a member of the public, artist or promoter?

"This sounds great, but can you make it sound . . . more blue?"

Artist from the past you'd most like to have worked for?

I mean, take your pick. I'd have fun doing anything!

What phrase sends a chill down your spine while working?

"Hey, do you think you can get this together in the next couple of minutes?"

What other member of the crew would you least like to be?

From logistics to catering, I have respect for them all.

Which other member of the crew do you take your hat off to?

The local crew. I've seen people of all stripes and sizes do things that blow my mind, whether it's feats of raw strength or that one quirky observation that might solve the thing I'm stuck on. People are amazing when they come together.

Most irritating thing on the crew bus?

Probably the bunks being about a foot too short in each dimension.

Best hotel you've stayed at while working?

Once they forgot to book hotels and had to put us in a very posh bungalow with a jacuzzi.

Members of the audience you loathe?

The person that took a dump in the entrance to FOH, or the one who decided to urinate on the subs just before we started the de-rig were particularly vexing.

Artists you'd spend time with socially?

I'm always happy to hang!

Best customs anecdote?

Constantly having to explain what my RF scanner is or why I have so many cables in my laptop bag.

Most bizarre sight you've seen at work?

A world record-breaking pie fight, a human conveyor belt, a fruit orchestra with a dancing dinosaur. There's been a few . . .

Favourite / Most hated venue?

I don't have a favourite. The top of the Walkie Talkie in London though, if I never do a gig there again, I'll have done one too many.

Open air or under a roof?

I do love being on stage outdoors.

Best festival?

Probably *BBC Countryfile Live*. It's always a really nice gig in the middle of a very crazy summer.

Closest you've come to death on tour?

Someone shouted 'HEADS!' from the roof of an arena and I froze on the spot. A shackle hit the floor a foot or so in front of me. From that height, it would have gone right through my hard hat.

Most outrageous thing you did on tour?

I dared to ask the monitor engineer for a photo of me with a pink llama. Needless to say, I didn't get my picture.

Most sensible thing you did on tour?

Bring spares. Hope for the best, plan for the worst. ☹

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tools from beyond

Brave Search | by Rob Halliday

"Brave first launched as a new privacy-focused browser about a year ago . . ."



An internet search engine? Really? You're going to tell us about a search engine? We have a search engine . . . wait a minute, I've written these words before.

That was back in 2015 when I suggested that you might like to give the then-new search engine DuckDuckGo a go in place of Google if you cared at all about your privacy and what might be happening to the result of your searches. That's an issue that has only become more pronounced in the years since, though many still seem alarmingly unaware of the risks.

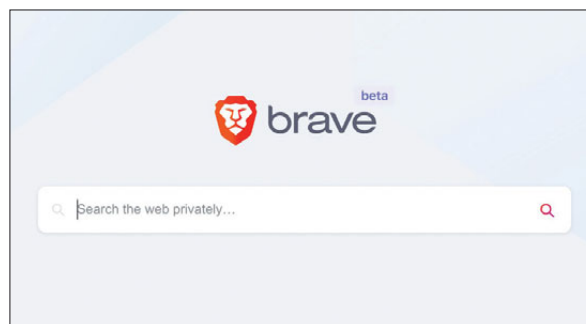
DuckDuckGo's promise was - and is - that it didn't track your searches. It's become my default search engine in the time since then - but it's fair to say that while the privacy is appreciated, sometimes the actual search results aren't quite as good as Google at its best. Other search engines are available - Microsoft's Bing, for example - but it turns out that DuckDuckGo actually uses Bing and others as part of its search process. If you turn to them for better results, you might be surprised when you get the same results. So then its, cautiously, back to Google . . .

Except another option has just appeared. It's as if someone has realised there's money to be made here if you have the nerve to compete with the might of Google. Perhaps that's why this one is called Brave.

Brave first launched as a new privacy-focused browser about a year ago. Now it has added its own, all-new, built-from-scratch search system. You don't need to switch browser to try it: just go to search.brave.com.

As with DuckDuckGo when it first launched, doing that feels like jumping back in time to the innocent early days of Google: an empty window apart from a small lion logo and a search box. Search results, too, are clear and uncluttered, just like way back then.

Of course, that's worth nothing if you end up with poor results. What's interesting here is that you certainly seem to end up with fewer search results than DuckDuckGo . . . but when you look closely, they generally seem to be *better* search results than DuckDuckGo.



If we take for comparison this month's *Classic Gear*, so a search for 'London Hydraulic Power Company'. Brave and DuckDuckGo get similar results, but they're easier to follow in Brave. More particularly, only Brave found one key article, the transcript of a talk about the system from 1979. Sure, Google found that one as well, but it was much further down the list and somehow harder to spot as being useful. Less, in this case, felt better.

As we've all surely learnt though, the real question has to be - how is the company paying for itself? Brave is trying a micro-payment option called Brave Rewards in its browser, to try to get some money to content creators and publishers (there's more details on its website).

Sounds like the company is still working it out for search: right now, Brave promises no tracking, but is talking about letting you choose a balance of privacy and sponsored search results that best suits you . . . Keep an eye on that and adjust your settings accordingly as they become available.

It's been six years since I suggested you try a different search engine. Feels like, for the tool you use so many times every single day, you should at least explore your options reasonably regularly. Don't like the end result? Just switch back. 🔄

👉 [//brave.com/search](https://brave.com/search)

Rob has been working in and writing about lighting for almost 30 years, on shows around the world. He wonders if this makes him a classic... or just old!



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#WE
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DOCTOR WHO

TIME FRACTURE



Like many of the best ideas, it seems obvious in retrospect: the bringing together of a character that has become part of British culture in its close to 60-year TV history with what still feels like the new kid on the block of live entertainment - immersive theatre. The result: *Doctor Who: Time Fracture*, playing now in central London.

Doctor Who, I'm going to assume, doesn't need much explanation. Even if you're not a super-fan - a Whovian, in the parlance - it's very much part of British TV history. An older generation remember its first appearance, the day after JFK's assassination. The show's conceit, that its lead character can regenerate into different actors, means each subsequent generation tends to have its particular favourite Doctor. And even if you only vaguely recognise the Doctors, the time-travelling Police Box TARDIS or, at the very least, the arch enemy Daleks will be in your sub-conscious somewhere.

Immersive theatre? That's younger, but now firmly established, and growing rapidly. It takes on various overlapping forms, but fundamentally, it means a live show where you're not just sitting down watching but are moving around with the action, sometimes even part of it. Punchdrunk is one of the leaders with original shows such as *Drowned Man* (see *LSi* April 2014). Secret Cinema is the other big name, taking a different approach by bringing familiar movies such as *Blade Runner* and *Back to the Future* to life, letting you walk into those worlds. Money should never be the only measure of artistic success, but it's worth

noting that the Secret Cinema mob have just raised almost £5m of investment - more than double their target - through a Crowdfunder fundraiser.

PRODUCTION

"*Doctor Who*, as a canon, is awesome for an interactive show: it has such a rich history, of sci-fi, travel, history, all these things that happen in every episode," explains director Tom Maller. "We don't have to apologise for everything not being connected, because the episodes travel through the TARDIS, the hero character of a time machine. It's perfect as a foundation for an immersive show because we can put contrasting worlds together. Having a fracture is a great motif for us; to have the ability to transition between spaces in a matter of metres and not have to apologise to the audience. It's expected." Maller comes to the show after working with Secret Cinema on its *Casino Royale*, *Dr Strangelove*, *28 Days Later*, *Blade Runner* and *Romeo and Juliet* projects, and as one of the co-creators of *The Immersive Great Gatsby*, produced by Immersive Everywhere who are also the producers of *Time Fracture*. He describes himself as being of the generation of "the barren years, so I didn't have



Rob Halliday reports on London's latest immersive experience that sees audience members assist the famous Time Lord on a bold new mission . . .



Doctor Who as a kid but we knew about it, and loved it when the revival began." After the phone call came from the show's producers, COVID happened. "So we all had lots of time to sit at home and watch *Doctor Who* - and then the biggest challenge was to decide which bits to do. We wanted to tell a new story, a live episode of *Doctor Who*, but at the same time to create some familiar worlds with familiar characters. So you felt like you stepped into the screen."

As part of that planning, the show's location had been settled on: two neighbouring buildings hidden in plain sight in the heart of central London. One of the buildings had been an antiques market; one a military barracks complete with underground firing range which the show uses to terrifying effect. The building's real history is worked into the show's narrative. "A bomb actually dropped on the site during the Blitz," says Maller. "So we just twist reality to say there was a bomb, but was it a German bomb . . .?"

DESIGN

The newcomer - perhaps the fresh eye - to the immersive world was designer Rebecca Brower. "This is my first immersive

theatre show, but I come from an outdoor event background, doing Olympic ceremony type shows," she explains. "But I also design theatre. This felt like a chance to use all those skills - I know scale, but I can also bring the detail that theatre requires. In fact, because the audience can get so close, it's almost like designing for TV. I'd even compare it to gaming because you can get into every nook and cranny if you want to."

The show also presented Brower with the interesting mix of a completely free reign ("time fractures are great - you can get away with anything! I've got a Van Gogh artwork hanging in the 1500s!") with some very familiar, and unchangeable elements - everyone knows what a Dalek looks like. But before deciding what anything looked like, she first had to figure out how to physically fit the locations required into the space available. She explains: "I started with the geography. We took a walk around the space, which was then literally a market in a basement, and I started seeing which location could go where. But we also had to figure out the audience flow. Plus, we had to remember the practical, behind-the-scenes spaces - dressing rooms, rack rooms and control rooms. Once we'd pinned that down, I could then compartmentalise each room, almost treating each as a different show. That made it easier for me to keep my brain from exploding!"

For what those spaces then contained, both lighting designer Terry Cook and Adam Finlay of video design team Novak

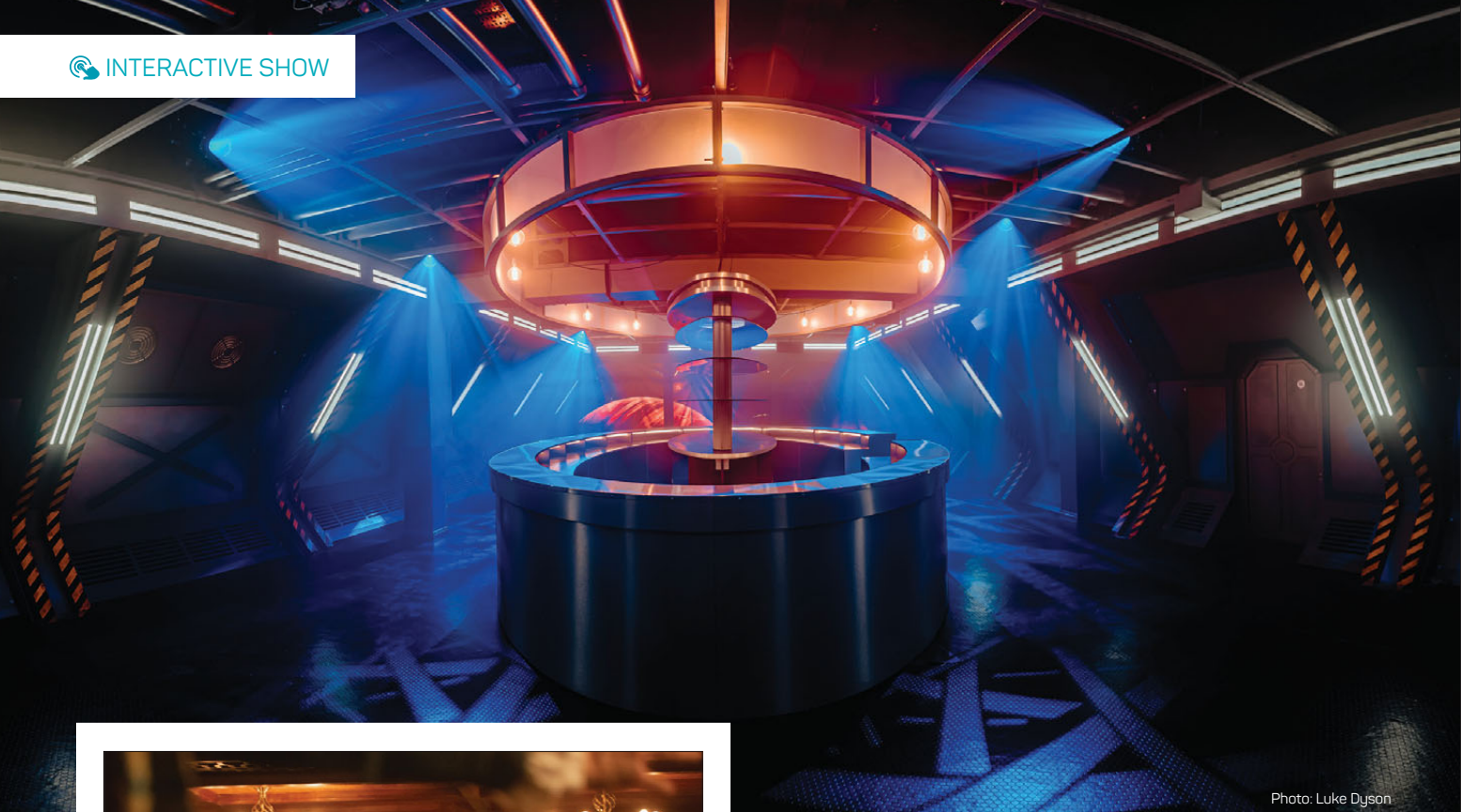
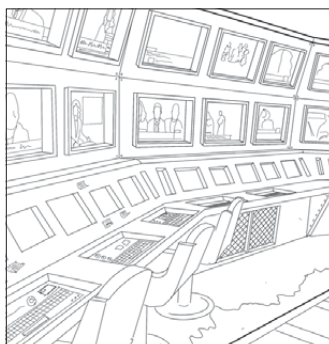


Photo: Luke Dyson



Photos: Mark Senior



Courtesy of Rebecca Brower

- ⬆ Zaggit Zagoo - interval drinks on a spaceship bar
- ⬅ The court of Queen Elizabeth I
UNIT HQ complete with interactive screens
Rebecca Brower's initial sketch of UNIT HQ
- ➔ Facing page: Rebecca Brower's sketches for Leonardo da Vinci's room, and the final set

comment that Brower was the one who dived most heavily into the *Doctor Who* world. "Rebecca did have to watch every episode of *Doctor Who* - then she'd guide me to the key episodes to watch. I think she's probably gone from a *Doctor Who* novice to Whovian leader within the course of this project," Cook remarks.

Ultimately, the key spaces range from a subterranean HQ for UNIT (the Earth-based team protecting us from alien threats), complete with monitors showing the chaos the time fracture is causing, through to Leonardo da Vinci's studio, complete with a magically-transforming *Mona Lisa*. Where the venue brought peculiarities of its own, the choice was often to embrace them. "The stream that runs through the middle of the venue is real, one of London's lost rivers that still flows under Oxford Street," Brower explains. "It ran through the market but was covered over when we did a site visit. We thought, there's no way we're covering that up. But we've actually had to put a couple of pumps on it to stir it up - we found that by itself, it was still on the top and flowed underneath, so people thought it was perspex and tried walking on it!"

Making it real was no simple theatrical fit-up - more of a building project involving planning permission and making holes in walls, dealing with asbestos, getting in air handling and sorting stairs, ramps, fire exits and all of the other complications of working in listed buildings being twisted to a new purpose, this led by production manager Zoe Snow of Gary Beestone Events. "We could never get accurate groundplans," Brower recalls. "Illusion, who built the scenery, and Unusual, the rigging company, came down and measured on a regular basis, and the only good thing about COVID was that we had time. They built it all in sections to be put together here, but then there was a hell of a lot of finessing on site." With the design filling the building, having space to build that design needed careful planning. "We built outwards," Brower notes, "literally built ourselves out of the building."

Once each area was complete, Ryan O'Conner and his props team would swoop in to dress it with a combination of new items carefully made to withstand close-up scrutiny and even handling by the audience, some original to the show, some "designed based on a really pixelated screen capture from a specific episode; the TV sets are not designed for 360° viewing, so we've had to kind of airbrush in the gaps," O'Conner explains. And then some came from the TV show itself. "They have three different



Courtesy of Rebecca Brower



Photo: Mark Senior



stores in Cardiff that we were invited to," he continues. "As the project has evolved, I think we've nurtured our relationship with them and the doors have opened further and further." They even got access to real Daleks and Cybermen.

Sitting alongside the static props are some magical ones, created by illusion designer John Bulleid, another immersive theatre veteran who has worked with director Tom Maller for some time. His work, Bulleid notes, is completely reliant on the collaboration of every department to make it connect with the audience. On this show, he's also had to make sure the effects are rugged, reliable and quick to reset; he sings the praises of the stage management team who now look after them: "That team on this show is ridiculous - the things they do to make this show work go above and beyond. They're an incredible bunch of people."

VIDEO

Video is deeply embedded in the design, though with different purposes in different areas. In the first room, the UNIT control centre, its work is the computer display screens conveying the urgent sense of panic about the threat facing the world. In other areas, screens are mounted in the set for particular effect; then in the last room video projection takes over, letting the walls come slowly to life before evolving into appearances by many of the Doctor's incarnations, including current Doctor Jodie Whittaker filmed especially for this show. There are, by everyone's reckoning, close to 100 screens or projected surfaces in the show.

All of the content was created by Novak, a Newcastle-based video collective of Keith Daniels, Elliot Thomson and Adam Finlay, that has grown out of VJ-ing into creating visuals for all kinds of large-scale projects. Brought into this project by Brower, they too were newcomers to this world of immersive theatre. "It's been a big learning experience for us," notes Adam Finlay, "but to be part of this team - lighting, sound, producers, production management - it's been an amazing experience." Novak joined the project just as lockdown came into effect - the show became their lockdown project. They too were pointed towards key episodes by Brower,

but though they were guided by that, particularly the existing logos and graphics, "ultimately we did our own interpretation of it, so everything is built from scratch." And whilst Jodie Whittaker was filmed for the show by the BBC as she was in production for the TV show, Novak handled other filmed characters, many during lockdown.

For the practical side of the installation, Novak turned to Dan Gray of GrayMatter Video, who designed and then supplied the system. An early plan had been to use distributed, simple BrightSign media playback devices, "but ultimately, as we realised the challenges of 80 screens across the site all needing to be unified and synchronised, fired on demand from the master QLab system run by sound with different combinations of MIDI and timecode during different parts of the show, plus the need to update content, perhaps remotely, we decided to switch to disguise, and the whole show now runs on just two disguise 2x4 Pro media servers," Dan Gray explains. This also helped keep the show on budget. To route those two servers to the many screens there is "a rack full of Datapath FX4 video wall processors and two Blackmagic Design 40x40 SDI matrices that take the four 4K outputs from the servers and break those down into 70 separate outputs, each 720 resolution." In UNIT HQ alone there are 54 32" monitors; all of this material was created by Novak but ultimately exists as one clip, the material for each individual screen positioned to line up correctly. That did make for quite a big file. "I'd change things on one monitor, and it was sometimes quicker for them to bring the file down from Glasgow than to try to upload it," Tom Maller jokes.

In the last room, screens give way to projectors, eight 10K Panasonic MZ10s. Here, too, the disguise servers proved their worth "as we could build a 3D model and map the space, rather than just using flat keystoneing."

Getting data around the site involves using SDI rather than fibre on cost grounds. Here, too, the work was building-site-like, with "a first fix - all of the rigging and cable runs, then a second fix for all of the end points and servers. We did one week on and one week off to keep some separation from other departments." The system is now overseen by a team led by Ed Aspinall, who worked alongside Gray on the complex programming. "Ed has been at my shoulder throughout, because that way he knows exactly what's been programmed, so if there's a change or an issue, he knows what to do," Gray explains.

LIGHTING

"I was working with Tom in China, doing *Casino Royale*," recalls LD Terry Cook. "In the middle of that he pulled me aside and said, I've



- ← The Portal Stabilisation Gateway, protecting Earth from the time fracture
 - Facing page: The telepathic Ood make an appearance . . .
- . . . as do the Doctor's arch enemies, the Daleks

Photo: Mark Senior

That involved the practical side - getting cable around the place. "We thought of using cable tray - especially in the first room, that's exactly what would happen in an army base. I think it's fair to say that Rebecca needed a bit of persuading, but I remember one of the last things she said to me was: 'Terry, I can't quite believe I'm saying this, but you've converted me to cable tray actually being quite special!'"



Courtesy of Rebecca Brower

From there, Cook started figuring out fixtures. "I knew because of the size of the venue and budget we simply couldn't have moving lights in the show. Which is reassuringly petrifying! The challenge of not having them is that you really have to hone in to what the director is wanting to do in the space." Then finding lights that could hide themselves even in rooms where the ceiling height was generally 2.3m or less. "There are only two rooms where we have what I call full-size fixtures," Cook notes, "and many of those are ETC LED Source Fours with 90° lenses - I've never ordered so many 90° lens tubes! But I've never ordered so many birdies either, and we use a lot of LED Source Four Minis."

At the producer's request, careful costing exercises were done, with the result being that some of the rig is purchased (some second hand), and some rented, from White Light, with some specialist items from Electric Foundry. The system - including 1,200m of LED tape, many practicals, strobes and other small effects, festoon and smoke - was installed by a small team, masked and regularly tested, over several weeks, with Cook visiting on Tuesdays and Thursdays to track progress. There were then five days of focus. "And then on the sixth day, Luke [Swaffield], the sound designer, and I sat in front of QLab inputting the enormous amounts of MIDI and timecode data," says Cook.

That was the result of months of conversations, where Cook "just started noting cue points, not worrying about numbers, just putting in references; 'man talking in bar' or whatever. Very quickly you start to have a cue list for each space. Then the problem comes of linking the spaces, so when something happens in one space it's triggering a reset in another space, or there are lights used to warn the cast something is about to happen in another space. Ultimately, we have global MIDI that would trigger something across a number of areas, or

been approached to do a new immersive show. He couldn't tell me exactly what the show was at that stage, which is a tradition in the immersive world. And so, of course, I said yes . . . to something I didn't know what it was, when it was, or where it was! That was me, hook, line and sinker. Tom is the type of director who can do that, just by his manner." For his part, Maller says: "I love it quite dark; darkness around the edges, quite stylised, quite theatrical but also quite fun and rock star, which is Terry all the way through."

Of course, this first iteration happened a while ago. "That was 2019," says Cook. "And here we are in 2021. I think the producers were insanely brave; shows around the world were stopping; at Woodroffe Bassett Design (WBD) we had a number of shows pause, and here was this group of young producers going, 'let's just keep going'. So we did, and it was incredible to have this in the background. In the long run, I think the show benefitted from all that time."

Of his first meeting with those producers, Cook says: "They sat me down and said: 'How do you light immersive theatre? Our big problem is you walk into a room and you're just surrounded by lights and they blind you the whole time'. I explained that the trick is to try desperately to make people think that they're in a room and

something is lighting them, but they don't really know what it is. And within a few seconds, they forget about it."

He continues: "I talked right from the get-go about making it much more practically heavy than theatrical units heavy." These two features - practicals, and concealing more theatrical fixtures - became a key part of the collaboration between Cook and Rebecca Brower. "From meeting one, Rebecca and I just hit it off; we had a very defined journey, which was to keep it as real as possible. She totally bought in to the idea of hiding lights behind walls, cutting holes in walls, making canopies around lights . . . That in turn pushed me to work harder to find creative technical ways to light the spaces."

Cook notes that for him, "immersive draws on everything WBD has to offer - corporate, entertainment, architecture, rock-and-roll and theatre lighting design. I start with architecture. On this show, Adam Povey - my production electrician, crew chief, in some way associate, and after the shows we've done together, friend and confidant - did a walk around the building, and he just generally shook his head going: 'Terry, you're mad, there's no ceiling height. What are we going to do?' And of course, you get a little freaked out at this point, we all do. But then, you start."



Photo: Mark Senior

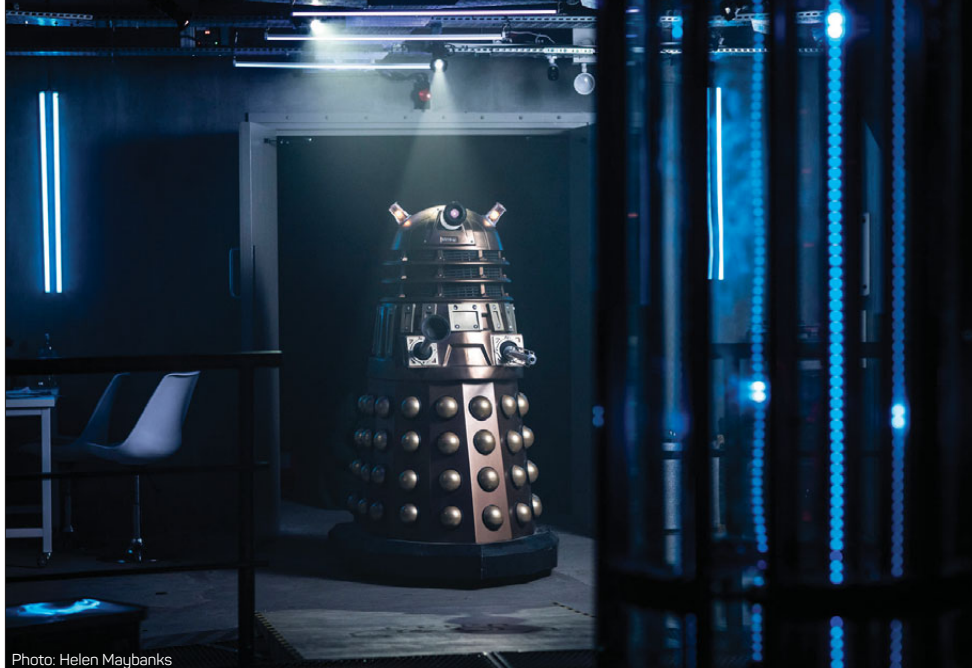


Photo: Helen Maybanks

a singular local MIDI - these are all made up words, but they work for us - that could be triggered by a cast member in the room pressing a button. And for timecode, we had global and local. That was the language of our show.

"Before the QLab day, the full technical team did what we call a paper tech on Zoom, where we talked through every minute of every wave of every part of the show. Then we spoke to Tom, Zoe and the producers and said, this isn't like anything we've ever done before, we need some time. The beauty of this schedule, which we might not have got pre-COVID, is that we were given two days just to sit down and test the mechanics of making sure this would all work. Then we were thrown off site for three weeks while they rehearsed the cast."

Then back to light it, "in a very traditional way - dry tech in the mornings, then bring the cast in. Cue to cue, run by stage management - but socially distanced and so all on intercom. For the first run I had three lighting consoles - we use ETC Gio consoles - distributed through the space. Matt Latkin, my associate and programmer, would be on the nearest console and I would just spray him with notes over comms. He tracked which room I was in so he knew which cue list to look at. Matt has done a few immersive shows with me and he really pulled together how we were going to manage the cue lists for this."

The lighting is now looked after by a team led by Jack Berry. "The big thing with Jack was him learning the show, so for the first three dresses he was an audience member, because the rest of his life is watching a bank of monitors, so it was really important he understood it," says Cook. "And the key thing is the rig check - I think if you have a clean rig check you'll have a clean show, so that is scheduled with stage management, and it's not rushed." With the show lit, Cook also measured and recorded lux levels throughout the space. "Three weeks after

you leave, someone always goes: 'Oh, it's got darker'. Having recorded the levels just gets rid of that because we can just send someone out to check." Light in the show is carefully controlled, with cast members drilled so they know where to stand for specials. Though, as Cook notes, "we can't put marks on the floor - they're really obvious in an immersive world. So you cheat, and put a big logo on the floor, and no-one notices . . ."

Cook is pleased with the end result, and in particular with the way the team worked together to achieve it. "The dialogue between Tom, myself, Luke and Rebecca had been so strong. We always knew what each other were thinking. I've never felt like that on a show before, and maybe the irony of all those Zoom meetings is we actually spent more time together than we normally would have. And it was great!"

SOUND

Luke Swaffield has two roles on the show. He's billed as, and is, the sound designer, but he's also the glue that ties the entire performance together, with everything ultimately running from his two QLab servers - "fully maxed out!" He, too, is an immersive theatre stalwart now, having designed shows for Secret Cinema and others. "What we're trying to do is create these crazy worlds where loads of things are happening all at once, but always still creating a bit of theatre where we're supporting the performance," he explains.

Swaffield was in Shanghai when the director started talking about the then-secret new project. "We were thinking we had about six months lead time before we hit site. Obviously, that became quite a bit longer . . ." Nonetheless, at the point where a design had to be put together, the show was still quite loosely defined. "My approach is very much to design for each room, because at that point we don't know, is there going to be a clock, a fireplace? So we put some speakers in each room, trying to balance the needs of one room against another. In one

space we knew we'd have a live singer and wanted a sort of jazzy bar sound to engage the audience - so a big, beefy PA there, but less in another room where there will only be a few people for a few minutes at a time. It's balancing out the budget." Though there are 17 rooms "there are actually about 22 acoustic spaces, because of the all-important corridors and transitional spaces. One of the things we've found in immersive theatre is there has to be sound everywhere to make sure you never leave the world."

Here, as with lighting, there has been a balance between equipment bought (principally, loudspeakers - around 120, from Martin Audio, EM Acoustics, Meyer, EAW and others) and hired from Autograph (more technical equipment that would benefit from Autograph's ongoing support through the run of the show). This was installed by a team led by Autograph's Jim Douglas and head of sound Harry Johnson. Powersoft T304 amplifiers power the speakers, while a Dante network carries the audio around the venue, via Cisco switches and Yamaha DME processors. Ultimately, "pretty much every speaker has its own level, EQ, matrix and delay, and its own output in QLab, to allow us individual control over everything so we can just do that single trigger in the corner cue," says Swaffield. Again as with lighting, care is taken to hide the technology as much as possible.

What's not here, compared to traditional theatre, is vocal reinforcement. "The interval singer has a mic. In the end section there's a very subtle, hidden mic. There are effects mics. But not vocal reinforcement - it's difficult to manage in an immersive environment, particularly where bits are improvised or ad-libbed. More importantly, it would also be quite alienating for the audience, when you have an actor in a microphone trying to have a conversation with an audience member who isn't, it creates a barrier, when we're trying to break those barriers down."

With a system in place, Swaffield had to create the sounds of the world to play through it - but this is a TV show with a 60-year history and some very familiar, well-established sounds. "Those sounds are so iconic - sounds like the TARDIS materialising. I knew I had to get those sounds right otherwise we'd get letters. The BBC arranged for me to talk to Harry Barnes, one of the sound designers on the show who's been there for years. My main takeaway from that conversation was that he genuinely does get letters!"

Through Barnes, Swaffield gained access to the genuine sounds, some still the very originals, a few actually still in mono. Swaffield worked to make them suit the live environment, "adding a panner, or more low end to things, or extra sub-harmonics to things like the TARDIS or the Dalek guns. We've got much bigger subs than anyone would ever have at home, so could really make stuff ping; make the audience feel it."

However, he also realised that it wasn't just technology that gives some of the *Doctor Who* sounds their particular character. "The Dalek effect, developed back in the '60s and '70s, is actually a very simple guitar pedal effect. But in messing about at home trying to recreate it, I realised that so much of it is about

the delivery of the line. An actor called Nicholas Briggs has been voicing those parts for years, so we brought him into a studio to record our dialogue because it was so important to get those voices - the Daleks and the Cybermen - absolutely right."

All of this, together with the specially composed music tracks, ultimately ends up in QLab, which this kind of show tends to push to its limits. "This is actually the first show I haven't broken it and had to call Figure53 tech support," Swaffield recalls. "That was part of the gift of time last year, which let me make some big overhauls to my workflow in terms of mixing down stems a bit more, doing more in ProTools rather than in QLab."

Like Cook, Swaffield notes the challenges of then working through every possible permutation of the show - but also the advantages of being part of a close-knit team. "We're very fortunate in that we've all worked together for years, so we can quite happily give each other notes and accept them."

While the show managed to open ahead of the full release from lockdown, COVID did throw one last curveball into the mix: the show is designed for 210 audience members at a time, but has opened with

a maximum of 90 permitted. For sound, that meant some care with levels when predicting how the audience would affect things. "But that's where previews come in; these shows are only finally fully formed with an audience. And in this case, we might have to revisit it when the full audience are allowed in."

IN PERFORMANCE

All this technology and effort mean nothing if the audience don't have a good time. But they do. "I remember just joining along with an audience, and realising there was a guy stood next to me dressed like David Tennant's Doctor," recalls Novak's Adam Finlay. "And then there were two young girls dressed in full Jodie Whittaker costume; they were just so hyped. From my point of view, having spent so much time there, wandering through the space just became my daily routine, and you could forget just how brilliantly exciting it is until you saw those fans' response."

Fans pleased, creative team pleased, that's surely good job well done. And hopefully before too long the show will be able to let its full size audience in, so more people can enjoy it - and so those brave producers can start to make their money back! Money isn't a good measure of art, but at the end of the day it does make it possible! ✕

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the conductor

Culture of fear

Electrical safety consultant James Eade lets sparks fly . . .

"I am seeing a general fear of being wrong, and people wanting everything prescribed for them . . ."



I had half an ear on the radio recently and caught a snippet of an interview, where Dawn French indicated that Jennifer Saunders and herself would not try to invent a show like *Absolutely Fabulous* again because it wouldn't be culturally acceptable. She is on record last October saying that she had become concerned that the modern day 'cancel culture' means comedians would not be able to do edgy comedy, for fear of losing their career as a result.

My own children, learning of the world via Netflix during lockdown, stumbled across the TV show *Little Britain*, much to their delight. I was never really a fan - I don't watch much TV anyway - but when we did watch it together, I realised what an accurate reflection it was of society at that time, even if it was through a cheeky, comedic lens. Her ladyship, having overcome initial horror at the thought of her children watching something so risqué, turned it to advantage and used it as a tool to educate them about society and social integration. We all felt a tinge of sadness when Netflix, BBC iPlayer and BritBox removed it: it is no longer acceptable content, we're told.

I do have some sympathy for Dawn French, Jennifer Saunders and their fellow comedians. It does feel like society is discouraging us from having opinions for fear of being accidentally racist, sexist, elitist or even just wrong. Even bona fide debating of social issues in the houses of Parliament are not immune; rebukes for expressing a view (and other opinions) come thick and fast from keyboard warriors in the form of texts or social media posts, and it is even worse on social media itself.

Leaving the diversity and inclusivity issues aside (for it really is not my forte), I am seeing a general fear of being wrong, and people wanting everything prescribed for them. Obviously in this context it is largely around the subject of electrical safety management and processes, but it is also present in some of the training courses we run, too. "What do we need to do to stay out of the dock?" is a common theme, along with a blind dogmatic attitude to sticking to the rules. On the training, we often find (typically, younger) people want everything in detail. What books do I need? Which chapters should I read? What should I do if I don't pass?

This ability, or desire, to put effort into reading and researching seems a bit of an anathema to some. Granted electrical safety, design and management is a vast subject, and itself is a small part of the even bigger holistic area of

health and safety compliance in general, one can be forgiven for not knowing where to start, but usually the Health and Safety Executive (HSE) website is a good place. In general, I'm impressed with the guidance that HSE issues on a range of subjects; it is usually well-written and understandable, and sign-posts readers to more detailed or technical references as appropriate.

I don't know why we have such a culture of fear around being wrong. It might be that with the passing years, I see more readily an attitude that may have always been there. The statistics though are quite interesting and somewhat reassuring. From a peak of 682 prosecutions a year in 2015, there has been a steady decline to 342 in 2019/20. Over the same period, there has been (roughly) an average of 8,000 improvement notices served each year over the same period. Notably, the average fines have increased - the average for the last year being £110,000. Seven companies were fined more than £1m.

Against a backdrop of four million limited companies in the UK (of which roughly two million are operational and half of those are employers), it makes it pretty unlikely that one will end up as a recipient of unwelcome attention from the HSE - a 0.03% chance as an employer for a prosecution or 0.8% for an improvement notice. You are 14 times more likely to be injured in a road accident than prosecuted - using accident statistics as a percentage of those holding a driving licence. So in practice you are probably far less likely, as not everyone who holds a licence actually drives.

The saying "rules are for the guidance of the wise, and the blind obedience of fools" doesn't seem to have much in the way of provenance, some even attributing it to Solon, the law maker of Athens around 580 BC. Regardless of its origin, the quote (and its variations) are very apt when it comes to management of electrical safety.

There is so much published guidance out there from the HSE and the Institution of Engineering and Technology that can be read up on. A pragmatic, proportional approach which is documented, followed and audited, is all that is required. However, a blind adherence to the rules without consideration to the hazards in practice will almost certainly end up with the wrong kind of attention if you are unfortunate enough to become a statistic! ☒

James Eade is a Chartered Engineer with a 25 year career in entertainment technology and events, with electrical engineering being a particular specialism.



audio file

Safety curtains | Phil Ward speaks volumes . . .

"In a market supposedly defined by free trade, open competition and state-free transparency, the actions of most corporate marketing powers differ hardly at all from the Soviet Union's heyday . . ."



I bet somewhere, in some dusty drawer, there is legislation that insists that corporate organisations are not in fact entitled to repress the exchange of information about their visible marketing choices. It's just that I, for one, cannot afford to mount a showcase trial that would dig through that drawer and unearth the rules that confirm I can discuss microphones in stadiums without hurting the delicate feelings of a global soft-drinks manufacturer.

You would be amazed to hear how casually the instruments of publicity are sanctioned to block photographs, comment and other useful insights into the innocuous deployment of entertainment technology in the interests of one brand or another. One agent, for whom I have the greatest respect and completely shared values, has literally confessed to being denied "permission to publicise" the details of technical infrastructure at specific leading sporting events and venues in the UK. In just this way, my agenda of loudspeakers, plugs and sockets is routinely suppressed by the cavalier exercise of vested interest at the head of which, more often than not, is some form of sports sponsorship.

In a market supposedly defined by free trade, open competition and state-free transparency, the actions of most corporate marketing powers differ hardly at all from the Soviet Union's heyday in the 1950s. Their nearest rivals for information interference today are in North Korea.

This is a powerful lobby. While far from being someone who would hasten the cause of capitalism over COVID caution, I recognise some of the motives behind the industry's legal action, this month, against the UK government's less than accountable handling of several strategies supposedly meant to pave the way towards post-pandemic recovery. An impressive chorus of figureheads has stepped forward, beginning with Andrew Lloyd Webber in the UK national press last week and now followed by Cameron Mackintosh, LIVE co-founder Stuart Galbraith, Royal Albert Hall CEO Craig Hassall, and Peter Gabriel - the artist who's WOMAD Festival is the very embodiment of 'boutique': all the kudos, and not nearly enough cash.

Nevertheless, here's a group with more resources than I have to go through the courts and challenge the veil of secrecy that hangs over a policy of protecting major sport over and above rank-and-file entertainment, which has been handed a further four weeks of darkness despite its willing participation in tests that appear to establish a level of safety at least considered acceptable elsewhere. Somehow, and I'm not sure how, this

resonates with my own experience of being silenced when I might have expected every encouragement to celebrate the industry's true potential.

The first initiative to come under scrutiny is the Events Research Programme, instigated in April "to inform decisions on the safe removal of social distancing" from ticketed events. They have ranged from snooker to soccer and, it must be acknowledged, a few obviously safe and successful music events including two nightclub events in Liverpool hosted by Circus, as well as the Sefton Park Pilot music festival; and Download Pilot, held in its usual venue at Donington Park, where punters took a PCR test and a lateral flow test on the first day of the event, followed by a second PCR test afterwards.

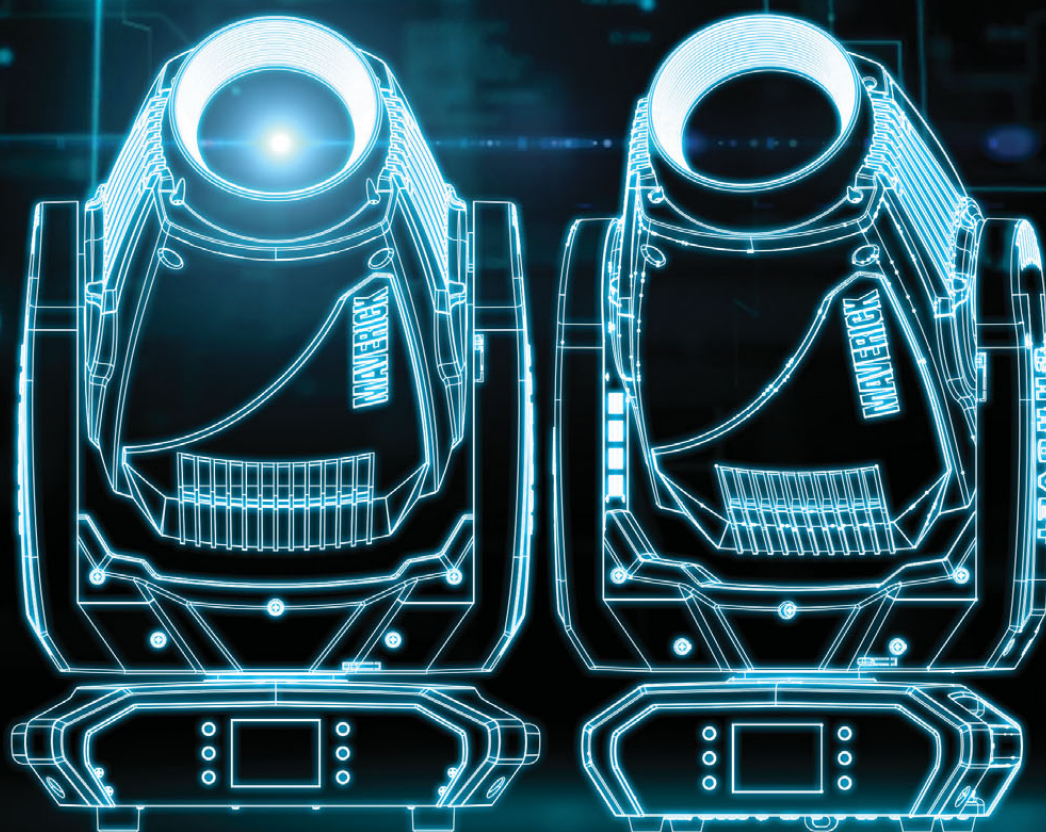
The only thing is, it seems at this stage that the only decisions meant to be informed by this series of pilot events are government decisions, because no one else has so far been granted access to a completed report on Phase One. According to the UK's Production Services Association (PSA), there is a groundswell of opinion that the real purpose of this scheme was to enable a few money-spinning sporting events to go ahead while the rest of the industry can wait - and wait without the information needed to make the crucial decisions that would guide reopening.

Among several detailed examples of glaring inequity, the PSA points out that theatre productions are forced to grind to a halt if one single member of a cast tests positive. It is odd, therefore, that the Scottish football team was allowed to continue into its next fixtures at the UEFA European Championship after one player similarly tested positive: one player who shared the dressing room, the pitch, the team bus and all of the training facilities up to that point with all the others in the squad. Perhaps kicking a ball is simply more important, on some grand scale, than singing a song.

Or dropping a beat. Mark Gillespie, who is CEO of global management and entertainment company Three Six Zero and cut his teeth in nightclubs, has expressed his dismay, via press release, at the "significant uncertainty around the opening of nightlife and clubs while Ascot, Wimbledon, F1 British Grand Prix and Euro 2020 have been given the green light to go ahead".

Conspiracy theories are for those with no history, and no future. But the net result of government favouritism is at least a kind of neglect - of duty, of care and of support for every vulnerable section of our riven community, not just those pockets who most effectively pot the advertising revenue. ❌

After turning a simple 8-track home studio into a hugely successful Miss Factory, Phil Ward turned to pro audio journalism and became an editor and now freelance writer. He lives in Cambridgeshire where he also runs a small taxi firm for the exclusive use of family members



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NEW FORMULA

Stufish has been at the forefront of entertainment architecture for well over three decades. Founded in 1994 by the late and legendary Mark Fisher, the company's pioneering work, passion and artistry has been behind some of the most innovative and iconic experiences in popular culture. From U2's 360° claw stage, to Beyoncé and Jay-Z's *On the Run II* floating stage and iconic landmark buildings such as the Dai Show and Han Show theatres in China, Fisher's vision remains in good hands.

One of the company's latest concepts is a new venue design called The Vertical Theatre Group. It is the brainchild of Stufish duo Ric Lipson and Paul Preston and production manager Jake Berry, who has worked for U2, AC/DC, The Rolling Stones and Madonna, and also co-produced the live touring version of *Walking with Dinosaurs* and Cirque du Soleil's *The Immortal Michael Jackson*.

MADE FOR ALL

The Vertical Theatre Group venue is designed as a new kind of performance space that can be used by all levels of the live

entertainment world - from theatre and festivals, to global artist tours as well as comedy, circus, and televised events. Aimed as a direct response to the global pandemic crisis, its design is based around a freestanding tourable structure, main four poster construction design with a roof to protect the audience and stage from the elements, and optional open sides for optimum airflow. The audience sit in balconies which can accommodate groups of four to 12 people or designated social bubbles. Another unique feature is that each audience member has an up-close view of the performance space and enjoys a VIP experience, bringing more people closer to the artist. Modular in size, the venue has the capacity for 1,200 to 2,400 people, depending on social distancing rules. The venue also has built-in global streaming capacity and food and beverage facilities.

Along with graphic visualisation, a 1:100 scale model has been made by Ric Lipson complete with lighting created by Rob Sinclair. A key feature in the design principle is that once



© Vertical Theatre Group

Simon Duff reports on a radical new venue design intended to alleviate the social-distancing pressures of the entertainment industry . . .

attendees

have arrived at the venue, they spiral up the side of the building in designated colour zones, with 2m-plus wide corridors. The visitors are led by ushers into the building, which is open air, with COVID-secure handrail access as well as hand sanitiser dispensers, PPE and a plastic screen separating audience clusters. To reduce congestion, the building splits the audience into four areas. Meanwhile, the lower deck on which the artists perform can be adjusted to sit farther from the audience. Onsite construction takes about two weeks.

Speaking over a Zoom call, Lipson and Berry explain their thinking behind the project. "At Stufish, we design sets as well as buildings," Lipson opens. "Perhaps our building architecture is less well-known to some people in the industry because they know so much about Mark Fisher and the association with rock'n'roll. Staff-wise at present, half of us are working on

buildings, usually theatres, and the other half are designing touring shows. We have completed permanent buildings in China such as the The Chimelong Theatre, Han Show Theatre and Dai Show Theatre."

"When the pandemic hit, Stufish was already working on a semi-permanent theatre project to be built in London to last for three years, and which was not The Vertical Theatre," he continues. "As the crisis intensified, theatres were either closing or reopening at half or quarter capacity. The capacity was about two things - firstly, the fact that to space people out, they were taking out half the seats, and secondly was that hallways in most theatres allow an audience to enter through a front door, go into a central foyer, then into small corridors in order to get to their seats. This process was causing problems.



- ↑ The Vertical Theatre can cater for a wide variety of performances, from concerts to club nights

Designed as a tourable, open air venue, the theatre offers improved audience access, with colour-coded areas and wide corridors

It takes just two months to build the theatre from scratch, making it suitable for use as a pop-up venue as well as a semi-permanent structure

"As architects, we are always looking at new and better techniques regarding how to move people around buildings, reduce touch points and create a better experience for the audience."

FLESHING OUT THE DESIGN

After the initial idea, Lipson contacted Jake Berry to seek his views on the Stufish design and current venue thinking. The newly-established project was announced at the start of 2021 with the launch of The Vertical Theatre design plan, a vision for a futureproof live performance venue.

The tourable free-standing venue allows for social distancing and will be ready

for roll-out later this year. The ambition is to have multiple Vertical Theatres around the world in due course, to give a much-needed boost to the struggling live entertainment industry. Berry says: "I could foresee individual artists, say a country artist in Nashville who didn't want to undertake world tours, using The Vertical Theatre set-up in their home town for a run of concerts. I also have a range of designs for it, from EDM clubs to car launches."

Lipson adds: "We've developed a bespoke version of the structure, with larger modular seating sections, which we'd lift from the ground up with motors, similar to the way a production crew would build a rock'n'roll show. It is designed to be tourable, however, some of the reception has been swayed to a more semi-permanent structure for people to have in their cities for a number of years."

Other key partners in the project include Katy Lipson of Aria Entertainment, an award-winning independent theatre producer whose shows include the UK premiere tour of *The Addams Family Musical*, 50th anniversary UK and European touring production of *Hair*, the European premiere of *The Toxic Avenger* and the revival of *The Mystery Of Edwin Drood* at The Arts Theatre, as well as the critically-acclaimed off-West End productions *The Last 5 Years*, *Pippin*, *Spring Awakening*, *Rags*, *Mame* and *Yank*. She also founded From Page To Stage Festival of New Musicals.



Also involved is Robert Delamere, a writer, theatre and TV director and producer whose theatre work includes *Force of Change*, *In Arabia We'd All Be Kings* and *Shoot the Crow*. He is creative director of Fremantle's scripted podcast *label Storyglass*, founder of Digital Theatre & Digital Theatre Plus, and chair of English Touring Theatre, as well as being an executive producer for Slam Films.

Another founding partner is Holly Gilliam of HDG Projects. A curator, producer, project manager and artist manager, working across film, TV and live events, she has curated several exhibitions about craftsmanship in film, co-produced the 2014 *Monty Python Live (Mostly)* - *One Down Five to Go* reunion show at the O2, the live broadcast of which was nominated for a 2015 BAFTA TV Award. She has also produced the 2015 documentary, *Monty Python - The Meaning of Live* and manages the four remaining members of the legendary comedy troupe as well as the Python brand itself.

GAME CHANGER

The Vertical Theatre is a bold venue design at perhaps entertainment's most challenging time. Now more than ever, brave, ambitious and creative solutions are needed to drive progress. Stufish and Jake Berry have long been at the helm of some of the industry's most innovative projects, and the signs that their latest venture will be another success are here. Audience management and safety when entering and leaving a venue have been key concerns during the UK

government's programme of test events, and this is certainly an area that the Vertical Theatre can provide a solution to. Of course, being a modular, tourable venue that can be erected in days and adapted to suit multiple event scenarios are also all major benefits in the current climate.

Berry concludes on a note of optimism: "Our door is open to anyone. We have some fantastic partners and a team working on investment. We are all reaching out. With all my years of experience in making things happen really fast in the touring world, I am learning to be a bit more patient at the moment."

"There is a lot of interest and we are finalising what we want to work with as well," he adds. "The cost of building is not outrageous and so to pop a venue up for a couple of months is very feasible compared to the cost of a normal building. Things are starting to pick up now. In the doom and gloom of October and November last year, things were not happening design-wise, so that is why we decided to hold off and not go public with the project until January 2021. The world has existed this past year, but every country has been doing their own thing. Now, it feels like the flow is coming back. New thinking and new investment will follow. America is picking up, and I think in another three months, everybody will catch up. As an industry, we will come out pretty strong, and we have to because entertainment is what keeps the world go round." ❧

➤ www.theverticaltheatre.com

"The world has existed this past year, but every country has been doing their own thing. Now, it feels like the flow is coming back. New thinking and new investment will follow..."

- Jake Berry



second fix

Commissioning time

Roland Hemming discusses the business of installations . . .

"The client asked if we could just commission the system for two hours a day. I said we could, but that the work would take weeks . . ."



Another large project of mine is drawing to a close. The equipment is installed, the racks are working, the network is in place, so it must be time to jump onto the next project?

Actually, no.

Everyone else on site thinks we must be done because they have heard things working, but as we all know, sound and lighting isn't just 'on' or 'off' - we need to commission our systems carefully.

Trying to explain the unique requirements of production systems to non-industry people is often difficult. Commissioning the sound system needs a quiet venue, lighting needs it dark and both need to be done without much other activity taking place, mainly for the benefit of other people to avoid them being blasted with sound or plunged into darkness at random intervals. So scheduling will always be a little bit of a compromise, but the client needs to understand how critical this element is. As schedules slip and deadlines inevitably shift, it's important to make sure that everyone is aware that this time is still needed. Unlike some tasks, you can't just throw more people at the problem; often, the entire system has to be worked through methodically by just two or three people.

On one project, the site hours were until 6pm, after which we had environmental noise restrictions, and the builders generally finished work at four. The client asked if we could just commission the system for two hours a day. I said we could, but that the work would take weeks and the commissioning team couldn't easily do other work on the same day and then travel to this site. This would get quite expensive as we hadn't allowed for working on such a piecemeal basis and the overall schedule would be seriously impacted.

Commissioning comes in two parts - there are the detailed system checks to ensure everything is working technically, and then there are the performance tests. Some elements of performance are measured with instruments; I do this frequently to prove the system has met the requirements of a standard. Some commissioning can be done offsite if you can do a FAT (factory acceptance test). This is normally where you assemble the racks and connect them together, to ensure the connectivity is correct and that everything can be controlled. Often, a successful FAT can trigger a milestone payment in the construction contract, so if the project lends itself to an offsite test it will speed up the later commissioning and improve your cashflow.

Some newer technology helps reduce commissioning time. Some loudspeaker systems have calibration microphones that can be deployed to automatically tune the system. This won't necessarily be perfect, but

will be far better than starting from scratch. There are plenty of networking diagnostic tools to help configure and debug control and media streams. All of this comes at a cost which may be difficult to justify at the start of the project, but may be invaluable as the project ends. Whilst clever tools may save time, they also can't completely replace the human eyes and ears. It's only right when we say it's right.

To give the client what they want, the work also involves a degree of subjectivity and lots of experience. You can't teach people how to equalise a sound system with them sitting in a classroom - you just have to do it, hundreds of times. The subjective nature of some of our work is again difficult to explain when you are writing a proposal or agreeing terms in a contract. This is so different to working in theatre, where dark time and quiet time is allocated and preview performances are a well-established part of the process of getting the technicalities right.

I once worked on a project where the subjective performance of the system was somehow built into the construction contract. The builders would only get paid if a panel of experts agreed that the sound system performed well under a variety of different circumstances. I had a very nervous builder who was completely outside his comfort zone. They engaged me to employ an actor, an opera singer, a rock band and an orchestra, who then each had to perform in the venue to ensure the sound was to the satisfaction of the panel. Playing to an audience of three was a surreal day for everyone involved.

With so much pressure during this time, one needs to make sure you plan this element carefully - a detailed checklist from connections to components to sub systems to the whole system. The checklist should include the different tests or performance parameters that need to be met for each element. All this activity should be tied to an equally detailed schedule of works and a good supply of notices to post around the venue to let others know what is going on.

When you are doing this work, keep to your brief. If cables have been installed by others and you find they subsequently don't work, it's tempting to start fault-finding and fixing other people's work, but this just soaks up time and money when you should be doing *your* job.

When you are putting a project proposal or tender together, it is important to include conditions for commissioning to make sure it isn't just an afterthought or something that needs to be squeezed in around everything else. You need to explain this work isn't easily compressed into a shorter time-span. The long-term performance of the systems we install really depends on getting this bit right, so make sure it is given the importance it deserves. ✕

Roland Hemming approaches 30 years of industry experience having managed two of Europe's largest audio projects and helping the industry with the latest technology and ideas.

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video matters

The new hologram frontier | By Richard Cadena

"The media server operator is in the driver's seat in an xR environment in more ways than one. And although media server companies do offer training, experience is the key to getting a job..."



I have two very vivid memories of Painter Hall, the physics building at the University of Texas in Austin. First, it used to have a strong aroma of must battling with formaldehyde that attacked your senses as soon as you walked in, and second, it was where I saw a real hologram for the very first time - on display in the middle of a non-descript entry hallway. I can't explain the musty smell with formaldehyde overtones, but if you want to know how the hologram was created, I'm your guy. I know exactly how it was done because I made one myself during my first year of college.

In a physics lab, we set up an old school (literally) helium-neon laser, split the beam with a prism, reflected one of the beams off a gold miniature replica of the Empire State Building, and combined the two, creating an interference pattern that was captured on film. Then when we illuminated the exposed film with the laser, it looked as if the miniature was frozen inside the film.

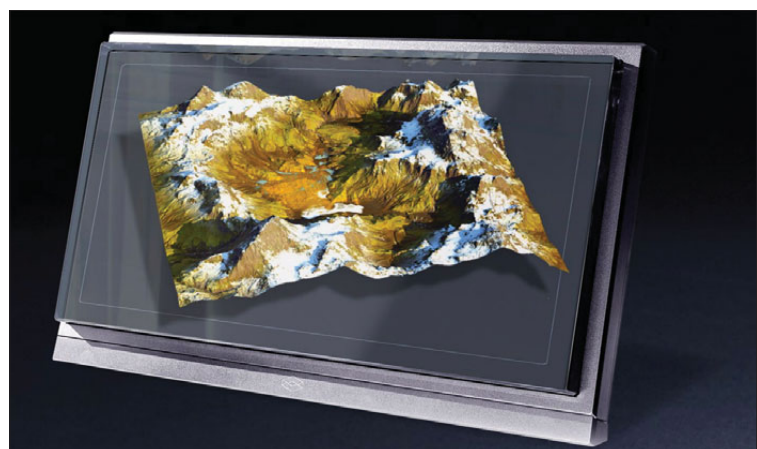
The result was crude at best - it was a monochromatic, very small, static image with a fairly limited viewing angle. But it was a true hologram, and at the time, thrilling to see it. You could walk around and view it from different angles and, depending on where you were standing, you would see a different part of the miniature. It's very different to the stage projections that are being presented as holograms today, and as far as I know, it had no real-world applications. It was a pretty much a novelty.

For a long time after I left college (roughly a kilo-annum for those of you who are keeping score), there was very little progress in holography. That changed around 2012.

Although it's not a true hologram, some ambitious people started bringing artists back to life on the stage using the Musion Eyeliner projection system, starting with Tupac Shakur at Coachella in 2012. Eyeliner is a clear, polymer screen installed on a stage at a 45° angle, and when the stage is lit correctly and an image of someone like Tupac is projected onto it from a high-powered projector below the stage, the image appears to be floating in space. As I heard Bob Bonniol once say, if you can't walk around from behind and see his butt, it's not a true hologram. Although it's really a Pepper's Ghost effect and not a hologram, from the audience perspective, it looks almost lifelike. I didn't see the Tupac 'hologram', but I have seen the same effect at the *Michael Jackson: One* show in Las Vegas. Although the image of Jackson is far away, it's still impressive.

THE HOLOGRAMS OF TODAY

After many years languishing in the ether, there is now some movement in hologram technology. There is a company called



↑ The Looking Glass Factory's 32" 8K hologram video display features a 45-element horizontal parallax light field

Looking Glass Factory was founded in 2014 in Brooklyn, New York, and in 2018, it launched a development kit for a desktop holographic display - it's a static display, but it's a true hologram. And now, the company has a 32" 8K hologram video display...

It's different than 3D TV in that it requires no goggles or glasses, and it uses "light field technology" implying that it reproduces the light rays that you would naturally see coming from a 3D object. That's an extremely challenging task, for no other reason than the amount of data required to do it. An 8K display (7680 x 4320) has a total of over 33 million pixels, and this holographic display has a viewing angle of 50°. It has a 45-element horizontal parallax light field, and each of those is a full 8K display. The fact that the specs only mention horizontal parallax implies there is no vertical parallax.

It supports Unity and Unreal engine formats as well as OBJ files. As of right now, it's only large enough to be useful for medical and engineering applications, and it's expensive enough that it's only useful for medical and engineering applications... But if the technology is scalable, then it could have implications for live event production, and for the right effect, price has never been an insurmountable obstacle in this arena.

Another company - Avalon Holographics - has developed a 29" full parallax holographic display. According to the specs, it features over 230 million rays, and beyond that, there's not a lot

For Richard Cadena, the road to authoring books and magazine articles ran through High End Systems and Martin, took a left turn at designer, tech, and electrician, and is still under construction.



↑ The Avalon Holographics 29" is a full parallax holographic display that features over 230 million rays

of information available about it, even though it is now shipping. There is, however, a great webinar series, *The Five Ws of Holographic Displays*, in which the two co-founders of Avalon, Wally Haas and Russ Baker, discuss their technology approach, its capabilities and limitations. Part one covers 'why, what, and who,' and features some great graphics illustrating how the display creates a light field.

In the Q&A, they discuss the differences between a hologram created by interference, like the one I first saw at the University of Texas, and one like theirs, in which each pixel recreates individual rays of light making up the light field. According to Baker, there is no difference as far as what the viewer sees, and creating a light field directly is a much simpler approach. Part two covers 'where and when.'

One of the main obstacles faced by the 3D TV manufacturers was the lack of content. It is not trivial to produce movies in 3D. But Haas and Baker said that they have built an Unreal engine, which has been released to alpha and beta customers. They are now working on a Unity engine, and can also provide an API for customer 3D applications that uses their own proprietary compression.

The biggest challenge they face with this technology comes down to commercialising the manufacturing in order to bring the price within reach of the general public. The biggest advantage, as far as I can tell, is that with these displays, there is no musty, formaldehyde smell. ☹

To watch the webinar series, visit:

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ON TEST

Robe's Forte

Mike Wood looks under the hood of Robe's latest colour-mixing workhorse with a transferable engine . . .



ABOUT THE EXPERT

MIKE WOOD

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We have definitely reached a plateau in automated LED profile spots in that there is now a tacitly agreed-upon outline specification that all manufacturers are working to, with differences in their own particular special features. That broad specification is for a unit with a white LED engine,

CMY + CTO colour mixing, one or two colour wheels, one or two gobo wheels, framing, and iris, plus beam effects. What we've seen is the brightness of white LED engines rise year-on-year as

the technology improves, and it hasn't stopped going up yet. We are seeing an arms race, with lumens as the target. The downside - to me, at least, as I get older and struggle to lift them out of their road cases - while the first LED-based fixtures were lightweight compared to their HID lamp predecessors, they are now back to similar weights. They use less power, produce less heat, and don't need new lamps every 500 hours, but the weight has crept up. As LEDs have become the norm, product differentiation is now in the details of the engineering, special effects offered, and innovations to help make the user's life easier.

This month, I'm looking at the new Robe Forte LED luminaire. As with the last Robe product we covered, the Esprite, the Forte uses the company's in-house LED white light engine in which the LEDs are separate from the homogenizing and collimating optics, allowing placement of the colour-mixing wheels in an optimal place, in the middle of those optics, for smooth mixing. This system also provides the ability to remove and replace the LED engine relatively easily.

I think the jury is still out as to whether this will be a compelling feature for Robe, but I do appreciate the improved colour mixing. It probably depends on your place in the supply chain. The lighting designer will look at the colour mixing and will like units that match in brightness, but may not care about the removable engine. A rental company might look at serviceability, the ability to switch out different colour-rendering engines, and to match light engines when making a buying decision. As to the weight, the Forte is 88lb (about 40kg), definitely lighter than others.



- ← The Robe Forte
- ② Light engine
- ③ NFC data from light engine
- ④ Collimating lenses

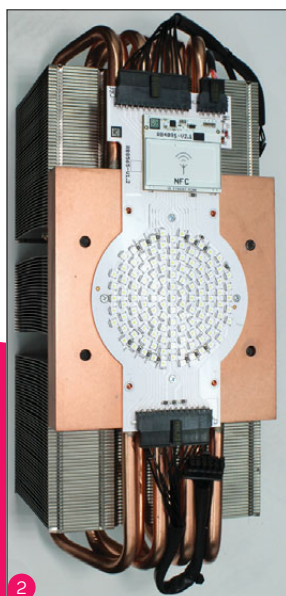
"There are four pairs of flags in cyan, magenta, yellow, and CTO. These are fairly saturated colours . . ."

The results presented here are based on my tests of a Forte supplied to me by Robe North America (Figure 1). I ran the fixture on a nominal 120V 60Hz supply, but the unit is self-adjusting for supply voltage and will run on any voltage from 100-240V, 50/60Hz.

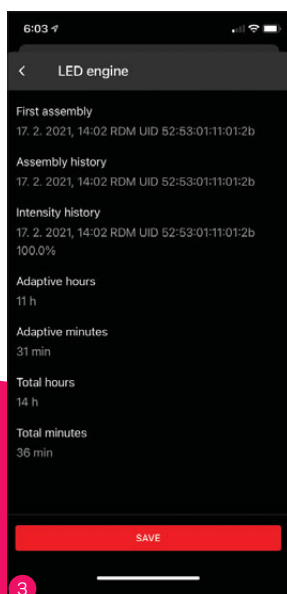
LIGHT SOURCE

Figure 2 shows the 1,000W HP white light LED light engine after I removed it from the fixture. It's very similar in layout to the Esprite, except that its engine had 73 LEDs while this one has 121. The LEDs and their circuit board - as well as the copper heat spreader, heat pipes, and heat sink - come out as a single unit after removing eight screws and unplugging three connectors. It took less than five minutes. I was also able to download the Robe app to my phone and interrogate the NFC system on the module. This is done without any power being required. Figure 3 shows the result - the data on that specific light engine, including its history and run time. The Forte also has a light level sensor mounted just inside the final output lens housing - Robe tells me it tracks the performance of the light engine and stores the data in both the light engine and the main Forte electronics.

Figure 4 shows the first lens array where the LED engine is attached. These are collimating lenses, one per LED, that direct the light through the colour-mixing system before the beams are homogenised. When the LED engine is back in place, the heat sink aligns with the six cooling fans mounted to the fixture, as shown in Figure 5.



2



3

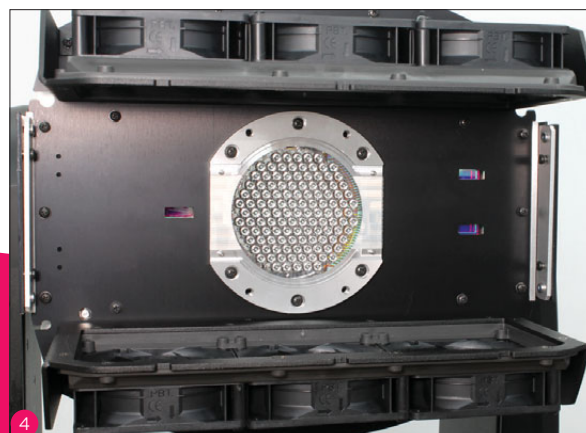
Just after those collimating lenses, on the other side of the bulkhead are the colour-mixing dichroics (more on them later). They are followed by two sets of fly-eye lenses, arranged in hexagonal arrays that provide beam homogenisation, and a final condenser lens that directs the light through the remainder of the optical system - you can see the condenser and fly-eye lenses behind the two colour wheels in Figure 6. Note that, unlike the collimating lenses, there isn't a one-to-one relationship between the fly-eye lenses and the LEDs. There are many more of them than LEDs so that distribution overlaps more than one lens. Effectively, each fly-eye lens samples the output of multiple emitters and mixes them together.

COLOUR SYSTEMS

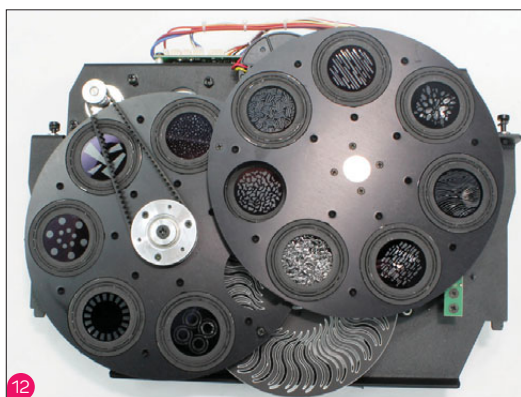
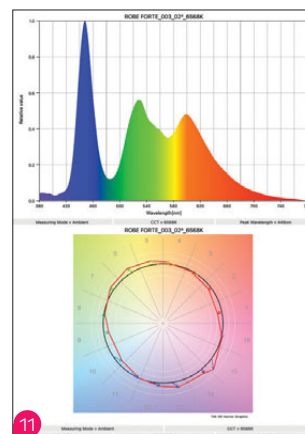
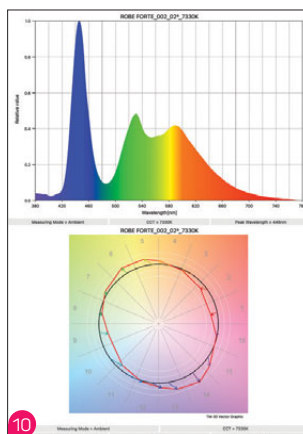
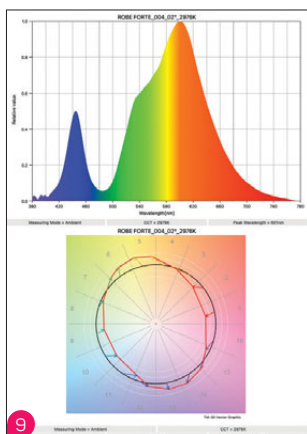
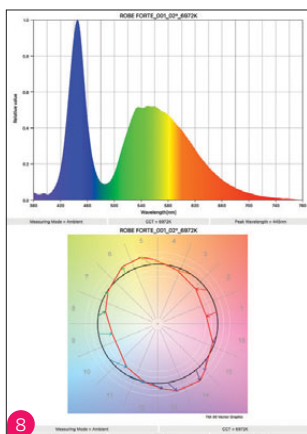
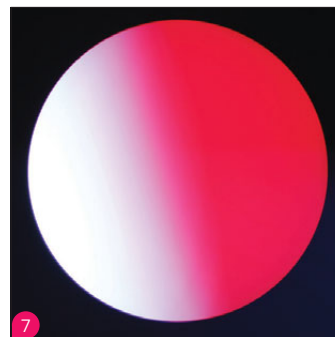
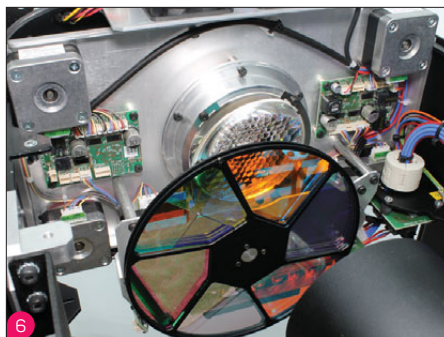
As already mentioned, the Forte uses a dichroic mixing system mounted between the two sets of LED lenses, an arrangement that helps to improve the uniformity and smoothness of the colour mixing. There are four pairs of flags in cyan, magenta, yellow, and CTO - the transmission of each colour is shown in the table below. These are fairly saturated colours.

COLOUR MIXING

Colour	Cyan	Magenta	Yellow	Red	Green	Blue	CTO
Output	17%	6.5%	74%	6.0%	9.2%	0.2%	42%



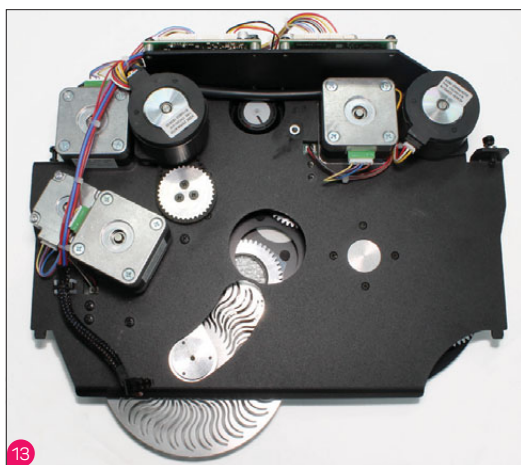
4



- 5 Cooling
- 6 Colour wheels
- 7 Half colours
- 8 Open white
- 9 Full CTO
- 10 CRI 80
- 11 CRI 90
- 12 Gobo module front
- 13 Gobo module rear

As with the Robe Esprite and other products in the Robin range, the colour mixing can be controlled via a virtual colour wheel channel as well as through normal CMY controls. The colour mixing is very smooth, and I saw very little coloured edging on defocused gobos with pastel colours.

Next in line are two colour wheels, concentrically-mounted on a single shaft, as shown in *Figure 6*. As you can see from the photograph, each colour filter is shaped as a skewed trapezoid. Robe has done this to compensate for the centre of the wheels being offset from the centre line of the luminaire so that the line between half colours will be vertical through the centre of the beam as shown in *Figure 7*.



COLOUR WHEEL 1

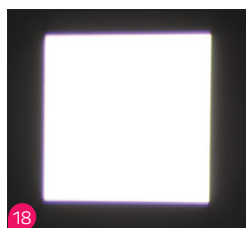
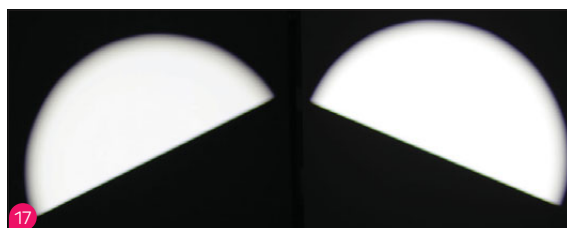
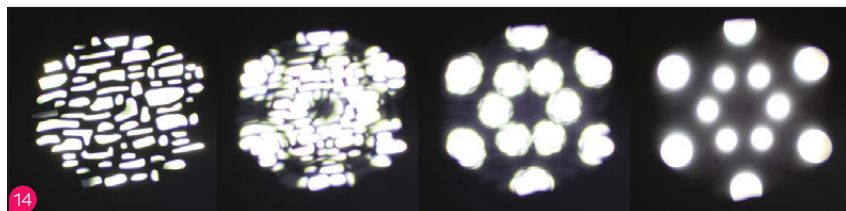
Colour	Deep Red	Deep Blue	Orange	Green	Congo
Output	0.8%	0.6%	13%	15%	0.1%

COLOUR WHEEL 2

Colour	Multicolour	Lime Green	Lavender	CRI 80	CRI 90
Output	N/A	71%	24%	77%	67%

I measured the spectrum and colour rendering of the Forte in four situations: in open white, with full CTO, and with both CRI filters. These results are shown in *Figures 8, 9, 10, and 11* and are tabulated below.

As we often see with white LEDs, the Forte oversaturates colours slightly in green and magenta.



SPECTRUM AND COLOUR RENDERING

Filter	CCT	TM-30 Rf	TM-30 Rg	CRI
Open White	6972K	67	95	69
Full CTO	2976K	71	97	71
CRI 80	7330K	75	102	81
CRI 90	6568K	82	103	86

Note: The unit I tested was fitted with the HP, or high-performance, LED engine. Robe also has an alternative engine called HCR, for high colour rendition. I was not able to test it, but Robe claims it has a CRI of 94 and about 60% of the light output of the HP engine.

The remainder of the Forte's optical effects are mounted on two removable modules, one for the gobos and animation wheel, and one for the framing shutters and iris.

GOBO MODULE

Figures 12 and 13 show the two sides of the gobo module. The two rotating gobo wheels are identical, each having six replaceable glass gobos supported in removable snap in holders.

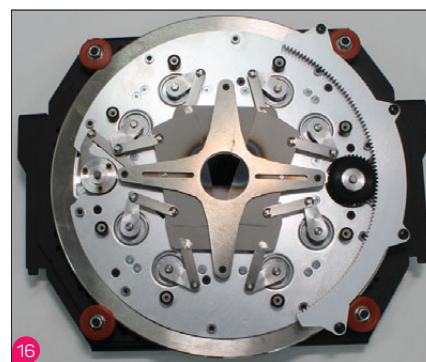
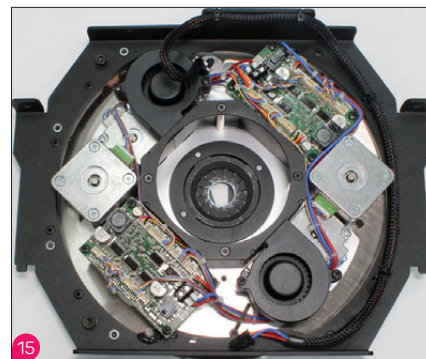
ROTATING GOBO SPEEDS

Gobo change speed (adjacent)	0.5sec
Gobo change speed (worst case)	0.8sec
Max gobo spin speed	0.38sec/rev = 159rpm
Min gobo spin speed	1784sec/rev = 0.03rpm
Max wheel spin speed	3.6sec/rev = 17rpm
Min wheel spin speed	54sec/rev = 1.1rpm

Rotation and indexing on both wheels was very smooth; I measured the repositioning accuracy at 0.05° of hysteresis error, which equates to 0.2" at a throw of 20ft. Figure 14 shows an example of a gobo morph from one gobo wheel to the other.

Last in this module is the animation wheel. There's nothing unusual here; this is the standard Robe breakup animation wheel. I measured it taking 0.4 seconds to

- 14 Gobo morph
- 15 Framing module front
- 16 Framing module rear
- 17 Shutter angle range
- 18 Shutter focus
- 19 Prisms

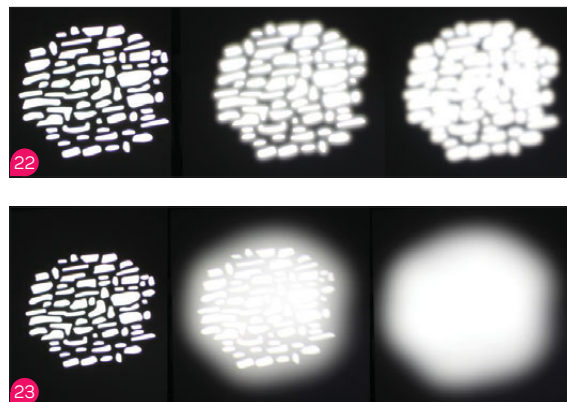
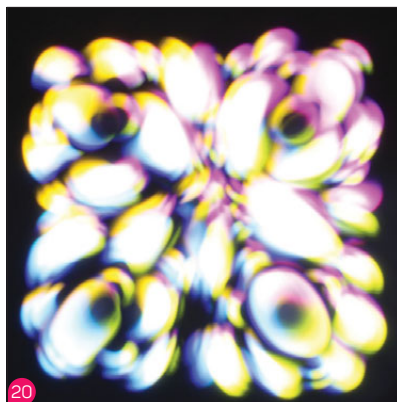


insert or remove the wheel and, once in place, it can be rotated at speeds varying up to 1.8sec/rev = 33rpm.

FRAMING MODULE

Figures 15 and 16 show the two sides of the framing shutter module and the iris. Each shutter blade has approximately $\pm 21^\circ$ of rotation and can move in to cover about 75% of the beam, taking about 0.3 seconds to move in or out. Figure 17 shows the range of shutter angle rotation. The entire shutter system can also be rotated $\pm 60^\circ$. The difference between focus on the four blades can be seen in Figure 18. In this photograph, I hard-focused on the right-side blade. This figure also shows good straight edges to the framing with relatively little pincushion or barrel distortion. There is some at extreme zoom ranges as you would expect, but nothing unusual.

Last in this module is the iris. This can open or close in 0.25 seconds and reduces the aperture to 17.5% of its full size, resulting in equivalent field angles of 0.9° at minimum zoom and 8.5° at maximum zoom.



PRISM AND FROST

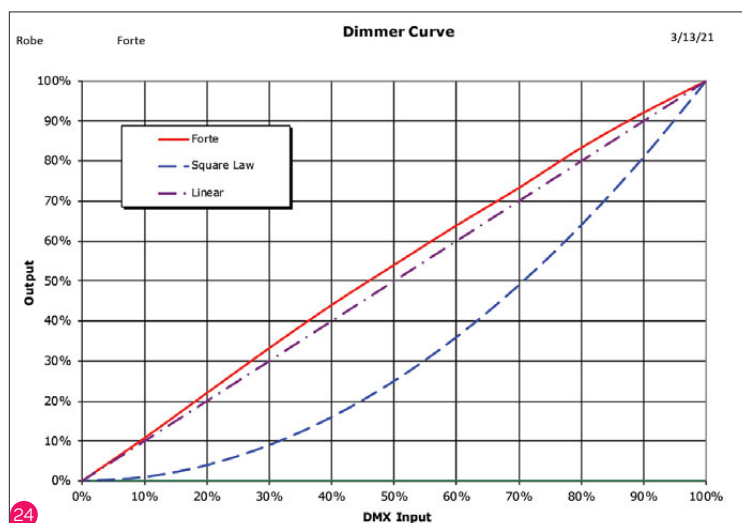
The Forte has two indexable, rotatable prisms mounted to the output side of the rear lens group. These travel back and forwards with that lens. Both prisms can be inserted separately or simultaneously, and their movement synchronised. *Figure 19* shows the prisms and *Figure 20* shows an example of the kind of effect that can be achieved by overlaying the two prisms - in this case, with the multi-colour filter and a gobo.

Because the lenses may have to move, inserting either prism can take up to 1.5 seconds; they can then be

- ① Combination
- ② Frost flags
- ③ Frost 1
- ④ Frost 2
- ⑤ Dimmer curve
- ⑥ Maximum zoom

rotated at speeds up to 115rpm or down as low as 0.13rpm in either direction.

Finally, we have two frost flags mounted to the input side of the final lens group just after the prisms, as shown in *Figure 21*. *Figures 22* and *23* show the effect on a gobo at 0%, 50%, and 100% for each of the two flags. Both flags are changeable through a magnetic attachment and can be inserted or removed in 0.4 seconds; they are also on the same DMX channel so you can't insert both flags at the same time.

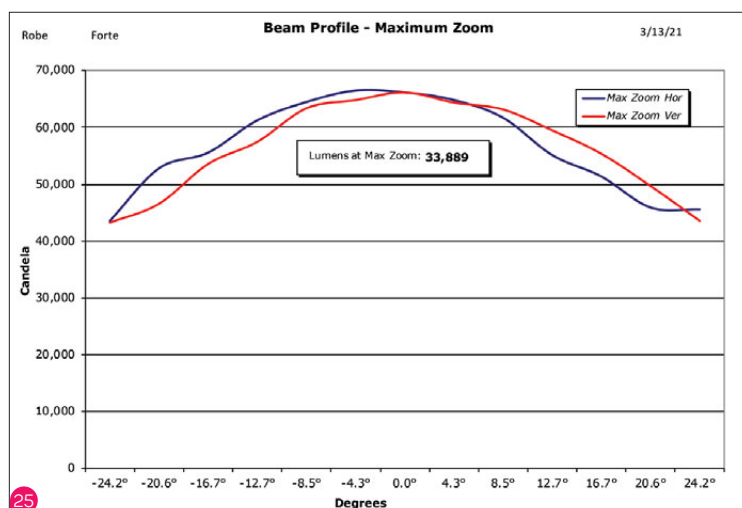


DIMMING AND STROBE

The dimming on the Forte is very smooth and clean, even at the bottom end. *Figure 24* shows an example of the linear curve. PWM defaults to 600Hz but optional frequencies, up to 2,400Hz, are available through the fixture menu or DMX-512 control channel. (FYI: In Europe, new Ecodesign regulations include flicker and will require 900Hz from this September and 1,500Hz from 2023.) Strobe range is adjustable from 0.5Hz up to a measured 18Hz.)

LENSES AND OUTPUT

Output measurements were taken with the fans in auto mode after the unit had reached thermal equilibrium. I measured thermal droop of the Forte at a maximum of 6% after running for five minutes at full power. This is a very good result and suggests that Robe is doing some thermal calibration. After that 6% drop, there were no further changes in output.



The Forte uses the ubiquitous three-group lens system: two groups that move for zoom and focus, and a fixed output group. I measured the zoom group as taking 0.8 seconds to travel from end to end with the focus group taking 0.6 seconds. The light output in wide angle (after reaching thermal equilibrium) was just under 34,000lm at a field angle of 48.5°; at narrow angle I measured 18,11lm lumens at 5.2° field angle. *Figures 25* and *26* show the beam distribution which is extremely flat.

Note: I measure light output using a flat-wall method and measure the throw from the hanging point. My results will differ from those from a goniometer. Firstly, I always keep my meter flat to the wall rather than pointing it at the light source, as happens with a goniometer; secondly, with a flat-wall method, the throw distance increases at the edges of the beam. This makes a significant difference at very wide angles. I do

**ROBE FORTE
TECH SPEC****FEATURES**

- ▶ Weight: 39.8kg
- ▶ Dimensions (WxHxD, mm): 483.5 x 843 x 288.5
- ▶ Source: TE 1,000W HP white LED engine
- ▶ Output: 82,000lm
- ▶ CTO: 3,000-6,700K
- ▶ CRI: 70 (filters for 80 & 90)
- ▶ Min LED life: 50,000hrs
- ▶ Zoom range: 5°-55°
- ▶ Pan/tilt: 540°/270°
- ▶ Prisms: 2 (linear/circular)
- ▶ Gobos: 12 rotating (2 wheels)
- ▶ Shutters: 4 blades
- ▶ Strobe: Variable up to 20Hz
- ▶ Dimming: 18 bit, 0-100%
- ▶ Protocols: USITT DMX-512, RDM, ArtNet, MA
- ▶ Data connector: 3-pin & 5-pin XLR
- ▶ Power connector: Neutrik powerCON TRUE1

have and use a goniometer as well, but I believe that a flat-wall measurement more closely replicates what a user sees on a stage with these kinds of luminaires. A goniometer will make wide-angled beams look flatter than I show. I've always used this method for reviews in this magazine and, even though my data may not agree with the manufacturer's, it is internally consistent and allows for comparing one of my reviews with another.

PAN AND TILT

I measured the pan and tilt range of the Forte at 540° and 270°, respectively. A full-range 540° pan move took 4.4 seconds to complete, while a more typical 180° move finished in 2.5 seconds. Tilt took three seconds for a full 270° move and 2.4 seconds for 180°. Movement in both axes is very precise with no visible ringing or wobble on stopping. I measured hysteresis on both pan and tilt at 0.05°, equivalent to 0.2" at 20ft.

NOISE

With 1,000W of LEDs to keep cool, the fans provide the noise floor for the Forte. Pan and tilt, along with zoom and focus, were the noisiest movements. However, the loudest overall was moving a prism into place, as this can also include moving both lenses to make space.

SOUND LEVELS

Ambient	<35 dBA at 1m
Stationary	48.7 dBA at 1m
Homing/Initialization	52.9 dBA at 1m
Pan	52.2 dBA at 1m
Tilt	51.8 dBA at 1m
Gobo	48.9 dBA at 1m
Zoom	50.4 dBA at 1m
Focus	51.6 dBA at 1m
Animation wheel	48.9 dBA at 1m
Framing	51.9 dBA at 1m
Frost	48.9 dBA at 1m
Prism	55.2 dBA at 1m

This was with the fans running in auto mode. Fan high-speed mode increased the noise level considerably but with very little increase in output. Setting the fans to their lowest speed made a big difference to noise, dropping it by 6dB, while output dropped to 88%.

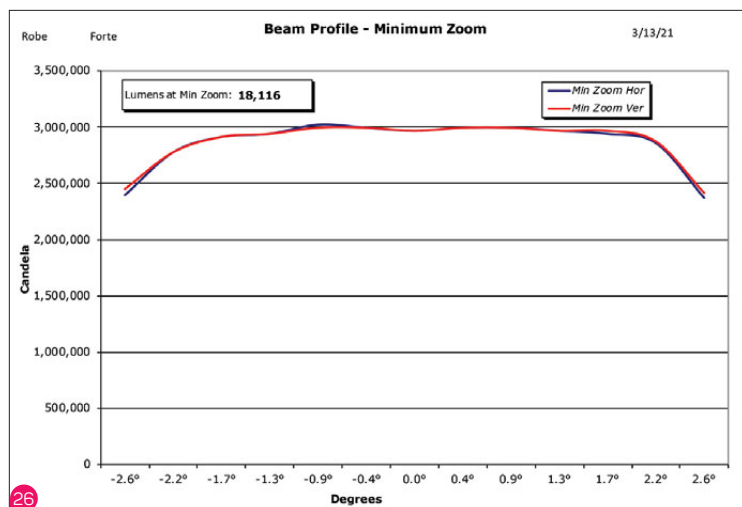
Maximise Creativity!



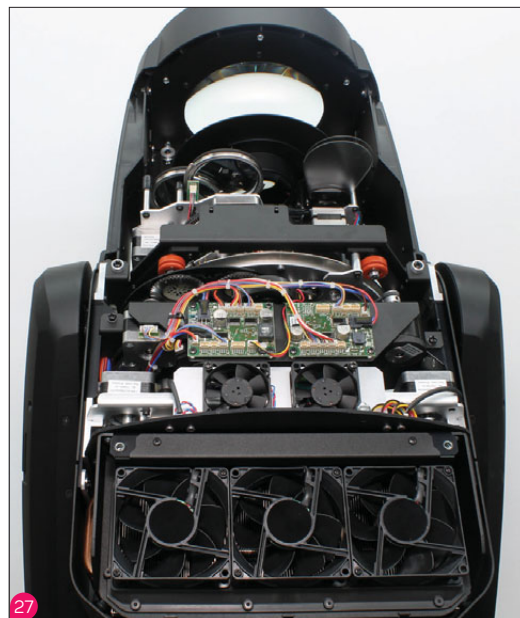
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LAMPY creative lighting consoles by Showtec - showtec-lampy.com

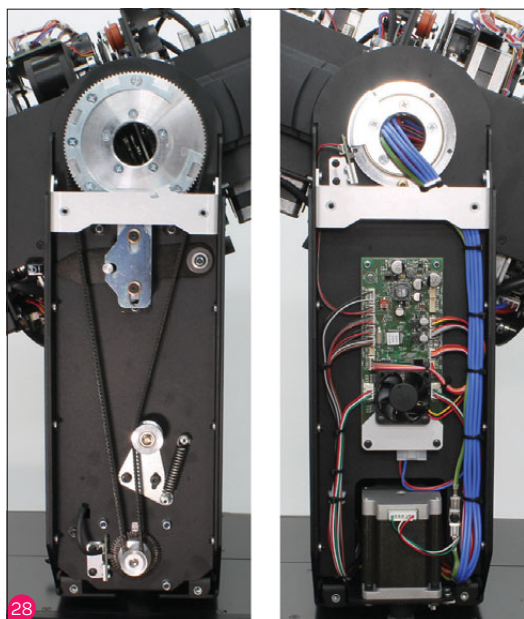
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26



27



28



29



30

- 26 Minimum zoom
- 27 Head
- 28 Yoke arms
- 29 Display
- 30 Connectors

HOMING/INITIALISATION TIME

Full initialisation took 91 seconds from a cold start and 69 seconds from a DMX-512 reset command. Homing is well-behaved in that the fixture fades out smoothly, resets, and keeps the LEDs off before fading up again after all reset movement is finished.

CONSTRUCTION

The Forte follows Robe's normal design with easily removable covers, modules, and distributed motor drive boards. Removing the two main optical modules was simple - I would expect basic maintenance and cleaning to be straightforward. Figure 27 shows the overall head layout. Figure 28 shows the two yoke arms with the covers removed revealing the pan and tilt motors and tilt belt system.

ELECTRONICS AND CONTROL

The Forte uses the standard Robe colour touchscreen system, which provides access to a comprehensive array

of setup and service functions (Figure 29). This includes RDM (tested using City Theatrical DMXcat), ethernet protocols, optional wireless DMX using the LumenRadio CRMX system, standalone operation, and self-test modes.

The connector panel on the opposite side of the top box contains Neutrik True-1 TOP (the black outdoor version that replaced the now obsolete standard True-1) power input along with standard five-pin and three-pin DMX512 connections and an Ethernet port (Figure 30). Robe tells me that, as an option, a user can have the Forte equipped with an ethernet out port. In that case, there is new circuitry in the unit that ensures the ethernet output passes data even if the fixture loses power.

I measured power consumption when running at full output open white as 10.4A, 1,186W, 1,207VA, a power factor of 0.99. The quiescent load with all LEDs off was 0.87A, 105W, 107VA, power factor of 0.97.

And so, we've gone from input to output on the Robe Forte. It showcases the next version of the company's in-house removable LED light engines with many of Robe's standard features. Is the Forte for you? I encourage you to get a demonstration if it looks interesting. The final word is always yours. ☺

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in profile

Phil Ward talks to **Simon Hodge**, founder of Surfhire . . .

"My first full-time touring band was ELO Part II, starting about 1993. They were huge stadium gigs, even if they were a bit off the radar . . ."



As Robbie Williams' *Take The Crown* tour crossed Europe in 2013, behind the scenes

Britannia Row's go-to comms guy Simon Hodge was perfecting a system with its own Midas touch. Brit Row had turned to Hodge for comms support, which he provided under the auspices of his company Surfhire, but this was something new: networked, punch-in comms that linked FOH, monitors, wandering crew and, crucially, the MD on stage. Having such a co-pilot on board to fly a production like this was too tempting for Brit Row, and Surfhire was officially acquired six years later.

Surfhire was the natural start-up for an audio guy with 10 years on the road at that stage, mixing cool bands at FOH and monitors, but who "always ended up being the person who sorted out the WiFi and comms," as he points out. Knowing that he wanted to be a sound engineer from the tender age of 14, and imagining a future at the BBC, Hodge had actually followed the journeyman's course into a local PA company.

"They used to do the cabaret circuit," he recalls, "so my early CV included Dave Dee, Dozy, Beaky Mick & Tich, Brotherhood Of Man, Bucks Fizz and lots of Butlin's holiday camps. But it gave me proper FOH mixing experience from very early on, and particularly these days when you're young you just don't get that kind of opportunity.

"Similarly, when I worked for RG Jones, a lot of the work was orchestral and I learned a lot from that. My first full-time touring band was ELO Part II, starting about 1993, and that was the step up to touring America for three months at a time and that level of commitment and continuity. They were huge stadium gigs, even if they were a bit off the radar; every year we would leave in May and come back in December."

The ELO affiliation neatly reveals that Hodge's home turf was Birmingham,

which means that SSE Audio was never far away. Hitching a ride with that particular fleet is bound to carry you closer to the cutting edge, and several rising bands of the late 1990s and early 2000s soon began to appreciate his ability to fashion their more Millennial sounds. This was the period that saw the rise of Yamaha's PM1D and L-Acoustics' V-DOSC, twin turbines of a new era of pro audio and "very happy days" according to Hodge. "There's a bit of a myth about analogue mixers and groundstacked, point-source boxes - which I do remember well," he says. "Used wisely, I can't help feeling that the digital systems of today do sound better, even if I am a bit sad to admit it. I've done a few comparisons, so I have to report what I hear. And that's from someone who still owns and loves an XL3."

BBC or no BBC, Hodge found plenty of freelance work on TV shows such as *The White Room*, Channel 4's short-lived indie beanfeast, and the venerable *Top Of The Pops* during its robust experiment with genuinely live performance. Here, he would meet clients of all the A-list rental companies, but it was the Robbie Williams connection that first brought him to the serious attention of Britannia Row.

As a regular on the Britannia Row call sheet, Hodge's contribution dovetailed into the plans for Clair Data Services, a specific push into portable connectivity and production IT. "It took a while to integrate my inventory with theirs," he says, "but I now feel part of a truly global presence. I was able to bring in some business, too, such as the UK athletics market - which needs a lot of comms, IT and walkie-talkie support - and long-term Surfhire clients like Sam Smith and Radiohead. We're trying to build up a specialist core of expertise within the company, keeping the Surfhire brand while pooling resources and generally moving with the times."

Today, Hodge is helping to spearhead Britannia Row's Virtual Live Audience (VLA) offer, a compact, mobile uplink that connects viewers - and delegates - to an event typically hosted in a TV studio or conference venue. It's a classic COVID compromise, but as we emerge from the pandemic, it's bound to take its place in Simon Hodge's armoury of communications panaceas.

"We've never had any internet audio issues with VLA, unlike many common platforms," he reports. "True, we are only running into hundreds of connections, rather than hundreds of thousands, and that means we can accurately monitor each connection's bitrate. Occasionally, someone's broadband breaks and we lose them for the rest of the show, but it's stable at our end. That makes me think that audio quality issues are to do with the application, and let's not forget that VLA is a premium, professional product."

As an adjunct to Brit Row's - and Clair Global's - touring packages, VLA is capable of inviting a great many more people into Hodge's gig cockpit, maybe not to discuss LF levels but certainly to engage with a tour in real time, wherever they are. You can guarantee that the comms innovations will flow as Clair Data Services expands rental horizons by surfing the internet.

"This is the future," Hodge asserts. "Coming out of lockdown, we've been transformed. There's a lot more reliance on this technology: streaming; comms; remote comms; converged networks - the idea that a single provider could host a whole range of services for everybody on a tour. We were about to do that when lockdown hit: no multicores; we would distribute audio, video, lighting, comms and internet everywhere via fibre so you could pick up any signal to go anywhere, full redundancy, with a lot less effort for the touring crew. That's where we're heading." ❧

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