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# New Worlds to Conquer

By: Sharon Stancavage

## Inside the brave new world of virtual production design

The COVID-19 pandemic has, at least for the moment, eliminated all types of live entertainment—from stadiums to arenas to theatres. To keep the music playing, artists—from EDM DJs to pop stars—have had to find new ways to connect with their audiences. What follows is a look at two examples of concert events, broadcast and/or streamed, that make use of inventive virtual production designs.

### Lightning in a Bottle

EDM festivals take place over several days and attracts tens of thousands of attendees—not a viable concept in this year of pandemic. However, the EDM community continues to reach out to fans. A case in point is the Lightning in a Bottle Festival, which, this year, went virtual.

The festival has taken place annually since 2006; the event is a combination of music, art, and culture. “We have been working with Do LaB, the production company that created Lightning in a Bottle, since the beginning,” says Heather Shaw, creative director and CEO of Vita Motus Design Studio. “We’ve been designing in col-

laboration with them for many years, creating and building structures together, not only at Lightning in a Bottle, but across the world at different festivals.”

Without an actual event this year, Do LaB wanted to keep the spirit of the festival alive, resulting in the creation of a three-day online virtual festival that included performances by artists Kaytranada, CloZee, The Glitch Mob, Beats Antique, and Opiuo, as well as other events, like lectures and

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yoga sessions. “When they told us they were going to do a digital LIB,” Shaw says, “they had already been working on a fairly dynamic schedule with some really unique programming, and we offered to help by creating the virtual space.”

The virtual festival included an overall landscape as well as specific stages. “Since Vita Motus has collaborated so closely with Do LaB over the years,” Shaw says, “when it came time to design the landscape, we knew what features had worked historically

at certain festival sites and what hadn’t. We built out an ideal site in Unreal Engine and inserted CAD models of structures from the Vita Motus and Do LaB archives. Vita Motus also used Unreal Engine to create a number of virtual structures, and to add in audio-reactive lighting [a capacity of Unreal Engine] into the scenes.”

“We’ve been using Unreal Engine [designed by Epic Games] for five or six years now, as a client visualization and communication tool in our normal processes,” Shaw explains. “We

design in CAD, then migrate everything into [Unreal Engine], so we can create 360° real-time renderings and fly throughs to give our clients a better sense of what the design will look like. With the real-time 360° world we’ve built out for Lightning in a Bottle, we have the foundation, potentially, of a game. We’re now looking at what the future could be for that product.”

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This spread: Virtual landscapes created by Vita Motus for the Lightning in a Bottle Festival.





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During the three-day event, Shaw notes, the designs “time-traveled throughout LIB history, showcasing different stage structures, including The Beatnest, The Treepees, The Triad, and The Hive. We also incorporated some of the most iconic LIB stages, including The Beacon, The Pagoda,

The Thunder Stage (Wapiti), and The Grand Antique.”

Also featured was a completely new digital performance area. “The Lake Stage [officially, The Water Temple] was created specifically for this virtual space,” Shaw says. “We got to enjoy the digital freedom of defying gravity and engineering. It’s designed with the Do LaB aesthetic in mind, as well as



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some of the dreams we’ve shared with Do LaB in the past to build structures in the lake. We hosted a TOKiMONSTA set on the Lake Stage, with lots of dynamic fly throughs and performance shots.”

TOKiMONSTA and Shiba San were two of the headliners. “We wanted to insert dancers from the community into the virtual 3D scenes of these featured performances,” Shaw says. “The dancers recorded themselves from home and saw themselves integrated into the virtual space; they could also see other people they knew, as they all mingled on the digital dance floor with silhouetted virtual avatars. We wanted to help people connect through visions of the past LIB Shiba San set and, looking to the future of LIB, the TOKiMONSTA set.”

The green screen dancers spotted around the stages and landscape were supplied by members of the LIB community. “Some captured the green screen performances from their houses, and some traveled to green screen studios owned by their friends,” Shaw says. “Green screen tech is relatively old-school at this point, and anyone can set it up at home, provided they have a good camera. We can also start incorporating the new depth-sensing cameras and other products/phones that come to market. The goal would be to see how we can use this tech to increase fan engagement during this time.”

This year, Vita Motus has been Beta-testing a concept known as Live Live Streaming Environments, or Live Live for short. “We’ve been trying to evolve the living room livestream into a live virtual space that could help create industry work,” Shaw says. “Many of our clients want to continue creating shows with the established teams they’ve been working with for years, and we want to support the process of getting them all into this virtual space together.”

Live Live brings together a variety of production professionals in the virtual space, says Shaw. “It would



include live remote musicians, live remote VJing, live remote lighting and programming, and live remote camera controls. Live Live also supports a great number of live effects.”

During one Beta test, Shaw says, “We took the existing Unreal Engine version of the EDC [Electric Daisy Carnival] BassPod stage that we’ve built for the past five years, made it 200’ tall, and inserted it into a crazy jungle scene. We then livestreamed not only the DJ, but also the VJs, who are based in Mumbai, and they were real-time activating the virtual scene’s LED walls through Resolume, connecting into Unreal. They had the walls flashing and the content changing with the track as it was playing. For live lighting in our Beta environment, we contacted Imaginary Lights, which is

building a lighting previsualization tool in Unreal. We collaborated to have the lighting programmer remotely activating those lights from his living room, with [an MA Lighting grandMA console], live in the scene. We are still developing the Live Live tool because we think it will be a really interesting bridge to get artists and musicians together from all over the world without having to travel.”

Shaw adds, “Internet speed is a primary consideration with Live Live. If we’re live-capturing an artist from their house, they are the initial network data transmission in the chain, and if they don’t have good upload speeds, it can become grainy or choppy. It’s essential that the Internet speed, which is such a variable, must get defined first. Despite any challenges that arise,

though, we know that the best way to predict the future is to create it.”

### Katy Perry on *American Idol*

One of the nation’s premier pop stars was struggling with the pandemic. “Katy is always looking for new ways to test technology and try new things,” notes screen producer J.T. Rooney, of Silent Partners Studio. Perry has released the first single from her forthcoming album and was anxious to get out and do some promotion. The singer and her team—including creative director Baz Halpin and lighting designer Cory FitzGerald—had some ideas for a non-traditional appearance on *American Idol*, in which she performed the song “Daisies.” “Katy and Baz were speaking about this,”



Perry performing “Daisies.” Only she and the chair are real.



Above and below: Rooney says, "We partnered with PRG [Digital Studios] in LA to use their physical space and to work with the XR stage that they have set up over there. Their team provided the LEDs, media servers, cameras, and a great group of people to go with it."

Rooney says. "XR [extended reality] is a technology that I've been helping develop; I've been working with other teams on it for the past couple of

years, especially the team over at [the media server manufacturer] disguise. Baz and I put this forward to Katy as an option. She wanted to do it and

was willing to let us take a bit of a risk on this.

Wikipedia defines extended reality as "a term referring to all real-and-vir-



Photos: Courtesy of XR Studios



tual combined environments and human-machine interactions generated by computer technology and wearables, where the 'X' represents a variable for any current or future spatial computing technologies—e.g. it includes representative forms such as augmented reality (AR), mixed reality (MR), and virtual reality (VR), and the areas interpolated among them.”

Rooney and FitzGerald have helped create a firm, XR Studios, which specializes in extended reality for live productions. FitzGerald says, “We’ve found is that it’s incredibly important to have a team in place to produce XR shoots in a streamlined way. You have to communicate with the client, management, designers, vendors, etc. The details—such as scheduling, stage management, and safety—are so crucial now.”

“XR is just more of a specific setup, which is meant to transport the viewer into different worlds completely,” Rooney says, “whereas other virtual production tools are just augmenting looks or adding onto existing sets. XR is more like an empty LED cube; you can put props in it, but it’s really transporting someone almost virtually.” FitzGerald adds, “The other component to remember about extended reality is the AR component; it is not only creating the world behind but completely around the artist, so you can put objects in front, above, and below them. You can transport people in space by moving the scene around them; there are practically infinite possibilities and options. The process uses the disguise server to power Notch or Unreal Engine real-time gaming engines to create the worlds around the performers with real-time effects.” In Perry’s performance of “Daisies,” the *American Idol* stage morphed into an animated world before returning for the finale.

The content was created by Silent Partners in Notch and run through three disguise gx 2c media servers. “Notch runs on a lot of the same principals as a gaming engine and was

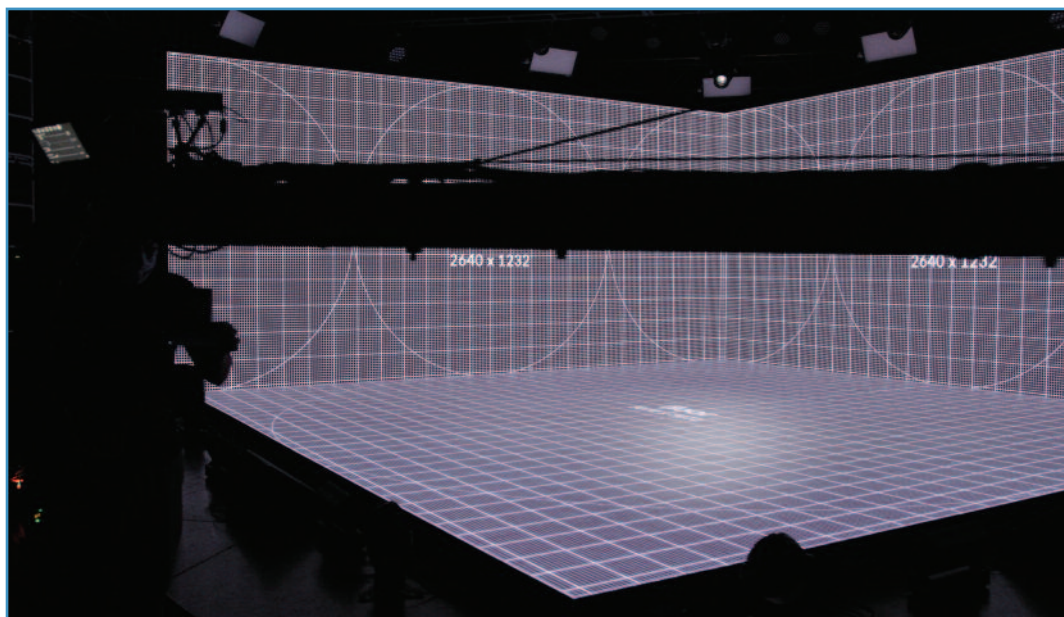
created by people who come from the video gaming industry,” Rooney says. “It’s based on that same sort of ecosystem. It is a creative tool built on a video game platform that’s meant for live shows. It understands what programming is like and it understands the needs of live shows.”

Rooney adds, “The best part about using disguise is that it’s the same tool we use in all our live tours and TV performances, so it allowed us to keep the same workflow, just in a virtual space. I think that’s really important. If you try to reinvent your workflow the same time, you’re reinventing everything else and it can get complicated.”

### In the studio

Rooney says, “We partnered with PRG [Digital Studios] in LA to use their physical space and to work with the XR stage that they have set up over there. Their team provided the LEDs, media servers, cameras, and a great group of people to go with it.”

Jeroen Hallaert, vice president of production services, says, “Because PRG has its own XR studio in its own facility, we could build this with all the aspects of working during these COVID times. The health and safety of all cast and crew was the highest priority; PRG has a designated COVID-19 compliance officer on-site. PRG rec-



FitzGerald says, “The stage is three sides of a cube, a square-shaped LED floor on a diamond formation with two rear LED walls. It is essentially putting something in a cube and dealing with the difficulties that come with that.”

Perry’s performance featured a chair that looked virtual but was a solid prop. “The best part about it is that it used traditional stagecraft and storytelling, and that’s what made it fun,” Rooney says. “Having a chair that looks real but could be fake, and playing with the audience a bit, is something we’re really happy about. It’s like an old theatre gag; it was a chair with fishing line on it.”

ognizes that COVID-19 is a new disease and many of the facts surrounding it are still being determined, but we were able to create the environment needed for this shoot. There were separate rooms for the sound supervisor, technical supervisors, unit manager, vision mixer, EVS operators, and other positions; we created private workspaces for more efficient social distancing while staying connected through the Unity comms system in



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The layout, Hallaert says, is "just under 4,000 sq. ft. The LED floor is 25' by 25', surrounded by a 50'-wide and 13'-tall LED wall. Both [walls] need to be perfectly aligned and level to the millimeter."

"In the control room," he continues, "we have a Grass Valley Kayenne, audio is run through the Calrec Artemis [console], and for live performances we also run a DiGiCo SD10 console and a Yamaha CL5 Dante control mixer. Wedges and side fills were d&b audiotechnik, which we can change out for Meyer Sound, depending on the requested flavor. The cameras for Katy Perry were Sony 4300s; they were absolute workhorses for this shoot. We can change them for any camera in our inventory. Essential in the whole XR process is disguise, not only for their gx 2c media servers but also for ongoing technical support

throughout the whole process. Next to all the technical gear, we have green rooms and a rehearsal space available on the same campus when building capacity exceeds our 10-person maximum-for-COVID-19 limit. We have our own flex trailers on the lot, which serve as extra-capacity spaces."

**"In order to further reduce staffing requirements, PRG set up secure internal communications, remote control, and streaming services to allow team members to work remotely from around Los Angeles as well as internationally; we had a team working in London simultaneously. This wasn't a tech demo; this had to be TV-broadcast-ready. We had to be confident in the tech so we could let the creative team have the time to discover how to tell a story in the new XR environment."** — Hallaert

"The studio had an existing rig, which we modified a bit, moving fixtures around," FitzGerald says. "[PRG is] a great partner, and we specified a bunch of what we wanted." Hallaert says the rig includes "a variety of

lights, including PRG's proprietary Best Boy Spots, but also GLP impression X4s, [Vari-Lite] VL2600 Profiles, Robe Pointes, and GLP JDC1s. It also has a range of ARRI SkyPanels."

FitzGerald says he made use of "10 [Vari-Lite] VL2600s, 14 GLP impression X4s, and 15 ARRI SkyPanel S60-C units. We used [these] as key light to make [Perry] look beautiful and to pull her in and out of the 3D scenes. There is a very delicate balance between lighting a person and not negatively affecting the digital background." His workhorse was the VL2600: "They were the main key lights; they have a lot of great options for color mixing and color temperature control. And they have a nice flat white-light output. I think they are certainly quality fixtures, and this was the perfect use for them. They are also LED engine-based, which is a plus."

When dealing with extended reality, FitzGerald says, "We don't want to light up the floor or back wall, but there are elements we can use to help hide them. It would have been easier if [Perry] stood still the entire time! In fact, as we changed elements of the background, or she moved around,

the camera tracked with her and we changed what was going on behind her; we had to do that live during the rehearsal and recording process to get it in a place that made sense. It definitely took some time; we learned that



you have to do the rehearsal in real time, unlike a tour where you can prepare, run it, and make adjustments. This is about defining each moment specifically. If she moves 3' forward, it changes the dynamic of how bright the lights are, because they're that close. You really need to watch that while you're rehearsing." He programmed the show on an MA Lighting grandMA2 console.

FitzGerald notes, "There was more color than I anticipated. In certain scenes, it made sense to change the backlight color, to add little front light color and texture, and to bring in different colors from different angles to give it three-dimensionality and follow what was going on in the scene."

Hallaert says that the shoot took place over three days. "Day 1 was used to load all content, from backgrounds and 3D assets to color changes in lighting, making sure all cameras, lighting, [camera] tracking systems (stYpe) all talked to the media server setup and everything was aligned and calibrated. Notch was used as the graphics engine for this specific performance, but we like to mention that the whole backbone is also set up for future Unreal and Unity shoots, lending more photorealism to the shoot." The second day "was used for rehearsals with a stand-in, to try all camera movements, lighting cues, and content check. As the performer sees the XR elements in real time on the LED walls and floor, it is easy to find references for the choreography. The flying and floating elements throw a shadow in the content and that made it possible, too, to react in a very natural way." Perry appeared on the final day for the three-hour long shoot. "It didn't take her more than a run-through and some camera tests to do the shoot in a few takes," Hallaert says. "As she walked off the stage to the trailer, she could see the finished result on-screen. XR doesn't need you to fix it in post; it's all very well prepped in pre-production.

"Early on," Hallaert says, "PRG

drew a line in the sand and asked, 'How can we do this project safely?' This forward thinking meant that not a single person had to get on a plane to complete this project. In order to further reduce staffing requirements, PRG set up secure internal communications, remote control, and streaming services to allow team members to work remotely from around Los Angeles as well as internationally; we had a team working in London simultaneously. This wasn't a tech demo; this had to be TV-broadcast-ready. We had to be confident in the tech so we could let the creative team have the time to discover how to tell a story in the new XR environment."

Hallaert says that key to the project on the PRG side was "Scott Miller, who we like to call Mr. XR. Working alongside disguise and PRG, he has been developing the production and technical aspects, culminating in the *American Idol* show with Katy Perry. As technical lead, it was his role to make sure when 'play' was pressed,

that all the required aspects combined to produce the end visual as per the creative's requirements. Anthony Vasquez and Charles Dabezies managed the on-site production elements, from building the equipment rack to configuring systems and final show cueing. This job was a team effort, but we sort of had to be everything—camera tracking, media server programming, camera calibration, color balancing, etc. That's largely because this XR workflow acts as the keystone of all other parts of production. Normally, we're used to video being a part of the show. In this case, video is the show."

The result was called "a spectacular digitally-enhanced environment," by *Billboard*. "A lot of this XR technology has been done in studio environments as tests and demos, and it's been exciting to work with a lighting designer on this doing color and hard shadows and hard transitions," Rooney says. Katy Perry's "Daisies" single is currently on the *Billboard* Hot 100 chart. 📶



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