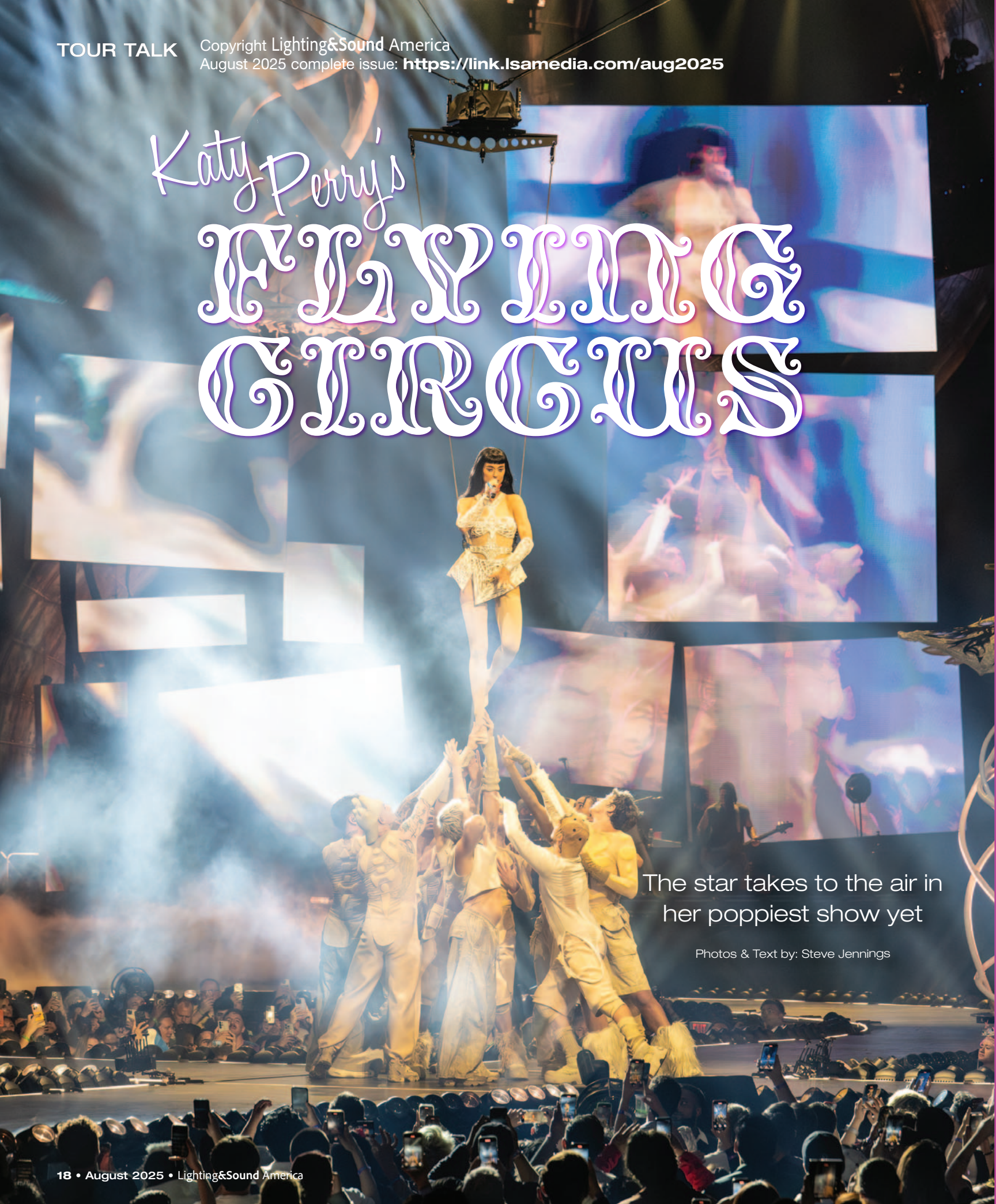
Katy Perry's FLYING CIRCUS



The star takes to the air in her poppiest show yet

Photos & Text by: Steve Jennings

Above: Perry executing aerial backflips. “We have a 3D fly rig used in two different songs: one with a massive flying butterfly and another featuring a fully choreographed flying number,” Richards says.

Katy Perry’s *Lifetimes Tour* is a futuristic journey, filled with energy as she and her dancers use every part of the stage, including an extended infinity-shaped runway. Perry is fearless, flying on a mechanical butterfly while singing, “Roar” and much more, including aerial backflips.

As described by Kat Sophia in *The Santa Barbara Independent*, the show features “a large backdrop with multiple screens showing animated videos of Perry’s ‘mission’...to free butterflies to restore what was lost on her planet as a half human, half machine.” Later, the screens show “an animated Perry fighting on her planet, finding where the butterflies [are] trapped.” Needless, to say, the singer triumphs.

We spoke with key production members about putting on this outrageously fun production.

Vince Richards, co-production designers

Richards, like his co-production designer Baz Halpin, a principal at the firm Silent House, says Perry is always looking for the next level, creatively and technically. “Her creative directors, The Squared Division [Ashley Evans, Antony Ginandjar, and Kaylie Yee], are right there with her, constantly challenging boundaries and driving innovation. With Katy at the center of it all, the collaboration becomes this incredible engine of ideas. It keeps everyone on their toes, and that’s what makes working with her so exciting.

“The Squared Division brought clear, bold ideas based on conversations with Katy that started with album artwork and evolving from there,” Richards continues. “Their vision helped set the foundation for choreography, storytelling, and the overall stage direction. It was a fast-paced, collaborative process that translated Katy’s imagination into an unforgettable live experience. Their ability to interpret and expand on her ideas made the entire creative flow feel seamless. It was inspiring to be part of a team so aligned in both ambition and execution.”

Richards’ biggest challenge with this set was that the props—some of which are the most complicated he’s ever

worked with—had to come up through the center of the infinity-shaped stage, through an 8' door, and underneath the venue scoreboards. “The under-deck world is a show in itself; it is packed with gear, automation, and crew navigating tight spaces every night to make the magic happen. Everything either has to rise from under the 5' stage or fold up and out of the way above it, which makes the logistics incredibly tight. We have a 3D fly rig used in two different songs: one with a massive flying butterfly and another featuring a fully choreographed flying number. There are floating rings Katy moves through independently, and a 10' orb that breaks apart and comes back together, holding Katy and ten dancers inside. It’s a wild show. We also have acrobats performing on hand-rolled metal flowers, handheld light-up pieces, smoke masks, and more. The show never stops moving or evolving.”

The glowing hearts that Perry reaches up to on the automated lift are an example of creative collaboration, Richards notes. “Glow Motion handled the winches and the fabrication, which involved a pretty involved process—3D printing, sanding, layering, all to get the right shape and opacity. Smooth Technology brought their expertise with wireless components and LEDs, helping us make the hearts feel alive onstage. The bo staff is from DAS Designworks, who developed a custom LED solution [for the lit-up saber pole Perry uses to fight off the warriors] that could stand up to the demands of a tour.”

The Squared Division brought strong ideas but also created space for discovery during rehearsals. “That’s why [the Brooklyn-based electronic manufacturer] Smooth Technology built a dedicated wireless protocol just for this tour, so we could adapt quickly and keep everything running smoothly,” Richards says. “At one point, we have about 20 wireless devices going at once, and it all had to feel effortless for the audience. The light rings are also from DAS, and having a partner who knows Katy’s world so well helped us stay aligned with the vision. It was a complex process, no doubt, but being part of something that ambitious and seeing it all come together onstage was a real privilege.”

Michael Curry’s design team brought the flying butterfly to life. “They were fantastic collaborators and allowed us to push the boundaries of what’s possible within the technical constraints of the stage, rigging, and overall process,” Richards says. “We’re always impressed with their ability to bring puppetry to life while staying closely aligned with the creative vision. They continually find new ways to innovate within technical limits.”

He adds, “I want to acknowledge our other vendors who created some truly impressive inflatables, including Landmark Inflatables and Airworks. Also, Stageworks which built acrobatic flowers and puppet tubes, Pyrotek for special effects, and Solotech, our lighting and video vendor. None of this would have been possible without TAIT. Their tireless work brought everything to life. From multiple T-winches to 360 flight systems, stage lifts, and building the entire stage structure, they were involved in every layer of execution. We’ve worked closely with all of these vendors for years and feel incredibly lucky to have built the relationships that made this production possible.”

Eric Marchwinski, associate lighting designer

Marchwinski notes that, as the scale of touring arena shows has grown, so has the complexity of lighting them. Three major aspects of this design led to a unique programming approach.

“Katy’s show spans nearly the entire arena floor, with much of the action taking place while in motion or spanning the whole thrust,” he says. “This creates some challenges for consistent key light and area light in general. Due to the 3D fly rig and varying venue shapes daily, we are limited in our fixture positions. The two side trusses, inclusive of two followspots, do a lot of double-duty work: sometimes front light, sometimes high side light, or backlight, all depending on where the action is. These trusses re-trim daily based on the geometry of the venue, to allow for the 3D fly envelope to be as large as possible.”

The creative brief for the show was to be quite theatrical, which creates a lot of discreet presets for each song. “We are always following the action with key light, backlight, downlight, etc.,” Marchwinski says. “When you add these three things together, you have quite a complex lighting word problem to solve. Now add the automation—3D fly, performer flying winches, center orb winches—and you have an even more dynamic show to light. The grandMA3’s XYZ functionality became the answer to almost all of these situations. Programming all position data as XYZ allows the freedom to manage all of these needs. We can make as many presets as we want, as well as re-trim our trusses without bloating focus time. Additionally, we can assign fixtures to automation axes with no impact to programming as automation timing changes.” This workflow decision, along with some careful consideration of the limited space over the thrust, led to a successful system to light a large and physically dynamic show.

The designers reached for fixtures they knew and trusted, but, at the end of the day, Marchwinski says a big light is a big light—and a paintbrush. “The deck edge fixture [the ACME Tornado] was chosen for the visual aesthetic it provides, which is atypical for us. The futuristic and robotic-themed show meshed well with this fixture, and the Tornado became a multipurpose tool. We use them as footlights when dancers are moving along the thrust and other times as a musically dynamic fixture for aerial and visual effects. There’s a specific height these fixtures have to be at to serve this dual purpose, without creating sightline obstructions. [Staging specialist] TAIT was very helpful in adapting to these needs, and the creation of the custom

Marchwinski says that ACME Lighting Tornados, lining the edges of the infinity stage, function "as footlights when dancers are moving along the thrust and other times as a musically dynamic fixture for aerial and visual effects." Tait created custom shelves to precisely place these units.

shelves allowed us to place these fixtures exactly where we wanted them. Additionally, our main workhorse was the Robe iFORTE, a light we have come to know and love. [TMB Solaris] Flare LRs, and Robe Spiiders rounded out the palette overall."

Brooklyn-based Smooth Technology handled the creation of all props with integrated set electrics, including tablets, jackets, the bo staff, backpacks, hearts, and more. The company also provided the entire wireless DMX system on the tour. "They have developed a proprietary system for robust delivery of wireless DMX and implemented it on all the props they created, as well as other scenic elements by other vendors," Marchwinski says. "Glow Motion provided some of their small winches for a more utilitarian need to move glowing Heart props down to the stage for specific moments. These winches were not driven by the lighting console, as they did not have the typical artistic implementation of their motion."

Mark Humphrey, lighting programmer

"We programmed the show on a grandMA3, which proved to be a fantastic tool—especially with its recipe workflow," Humphrey says. "We also utilized XYZ programming for all the dancer specials featured throughout the show. This has significantly simplified touring for [lighting director] Jonathan D. Martin, as he no longer needs to update over 100 individual positions. Instead, he only needs to adjust four pan/tilt positions, and all XYZ presets are automatically updated.

"We're also leveraging XYZ for automation tracking, which allows us to direct any fixture in the rig to follow Katy, whether she's on the flying butterfly or inside the orb. TAIT is sending us PSN [PosiStageNet], a network protocol to send and receive data, and with that, we can take that data and track any axis from it.

"Having Jonathan available during the day to run rehearsals with Katy, the dancers, and the creative team allowed me to focus in the evenings with fewer distractions. This setup made it easier to implement notes from

Above: Bennett notes that the main LED screen design is made up of 31 individual surfaces. “All are ROE [Visual] CB5 MKII tiles in frames built by TwentyThree and all provided by Solotech.” Opposite: The 10' orb that breaks apart and comes back together, holding Perry and ten dancers inside.

the day and accommodate any updated or new choreography we observed. Surrounding the infinity stage are the new ACME Tornado lights. These fixtures not only provide fun, dynamic effects with their five individually controlled pan/tilt pixels, but they also serve as a primary lighting source for the dancers when they’re on the runway.”

Jonathan D. Martin, lighting director

Martin has two grandMA3 full-size consoles running MA3 software. Aside from a handful of manual triggers, the production is fully timecoded. “Due to the extensive dancer choreography and the desire to cue those movements theatrically, we use XYZ position programming in MA3 for this show,” Martin says. “In terms of the daily focus, I update fixture positions to align with several calibration points onstage. MA3 then calculates any 3D spatial shifts of those fixtures and automatically updates all XYZ positions/TAIT automation tracking presets throughout the show. This focus method proves invaluable, particularly on days with a tight load-in schedule.”

With a tight rehearsal window, the programming team needed nearly full-day on-site coverage to maximize efficiency. Martin was at his console from mid-morning through the end of evening rehearsals, while Humphrey joined in the afternoon and carried the bulk of the programming into the overnight hours. The team took advantage of every opportunity available to reach the finish line.“The workhorse of this show is undoubtedly the Robe iFORTE,” Martin says. “We have 96 of them distributed throughout the flown rig—some providing flash and pop, others focused on lighting performers. Another essential fixture is the 136 ACME Tornados lining the infinity thrust. Mark programmed them to cleverly alternate between eye-candy effects and uplighting for dancers, a complex task given the constant movement onstage. The over-stage trusses feature 18 Elation PROTEUS EXCALIBURs, with an additional unit placed on each band riser. The rest of the rig is rounded out with 80 TMB Solaris Flare LRs along the flown trusses, 40 Ayrton MagicBlades on the band risers, eight Robe iFORTE LTXs in the flown rig for added punch, and 20 Robe Spiiders lining the upstage floor. Plus, eight more hung on the automation grid directly above center infinity.”

Regarding followspots, Martin says, “The infinity stage occupies the majority of an arena bowl, which creates a unique challenge for the spot call. During rehearsals, we spent considerable time dialing in the best followspot pattern to maintain consistent light levels on Katy as she moves from one end of the arena to the other. We’re using

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nine Robe iFORTE LTX Robospots, six on the front-of-house truss—every two fixtures are linked to one Robo controller—one on each side truss flanking the thrust, and one flown upstage for backlight. Additionally, we deploy up to four house followspots to help fill coverage gaps on the infinity stage and to track the 360° aerial fly gags. Most of my job during the performance is guiding spot operators through this tricky and fast-paced show."

He adds, "A shout out to our phenomenal Solotech lighting crew that I'm privileged to work alongside, some incredible techs on this production. And, of course, I'm grateful to Eric Marchwinski and screens programmer Kirk J. Miller for bringing me onboard, and to our fearless leader, [production manager] Jay Schmidt, for keeping me around!"

Omar Montes, video director

For Montes, this is a very complex production, as all the screens are broken down into different surfaces and sizes to create a single, unified image. “I am directing two separate video program line cuts at times,” he says, “one for the center position of the screens and one for the stage left and stage right IMAG screens. There is a total of 33 screens, all different sizes, including the stage left and stage right offstage 270 screens.”

The video package consists of using a Grass Valley 2 M/E Korona switcher, with a total of 15 cameras: six manually operated Grass Valley LDX 86 unit, two at the front of house, each with a Fujinon Digipower 99x lens, one slash on the main concourse with a Fujinon Digipower 99x lens, two handhelds inside the pit with a 14x wide-angle lens, one Steadicam with an AERO 30 rig and Grass Valley LDX C86N WorldCam, and three Panasonic PanaPods. “Each is equipped with a PTZ camera positioned inside the infinity pit, downstage center, and the eternity pit, located in the middle of the Infinity stage, as well as one at the end of the stage, on the catwalk closer to the front of house,” Montes says. “This one gets operated from backstage. All three of them via a PTZ control station, then five Panasonic Lumix BGH1s, 3 for the opening rings of the show, one per ring, two for the dancer handheld cameras, each one with its handheld rig.”

Dwain Bennett, media server programmer/operator

Bennett notes that the main LED screen design is made up of 31 individual surfaces. “All are ROE [Visual] CB5 MKII tiles in frames built by TwentyThree and all provided by Solotech.” LED processing is handled by six Brompton SX40s, which are all fed by three Disguise gx 2c media servers. “We have all the screens in the server’s 3D space, and with parallel mapping, they can properly align the screens with each other as well as the lasers that frequently trace on top of the video content to get this cool laser burning/etching effect.” All Disguise playback is programmed and operated using a set of grandMA3 full-size consoles at the front of house. “Using these consoles, we have a better and quicker handle on the Notch look controls, as well as manual IMAG looks, should we go anywhere unexpected during the show.

“Apart from what the audience sees, we also output from the media servers some utilities such as countdowns and returns to the video team and the crew working underneath the stage, so they know how much time they have before any given part of the show. This is very helpful for quick changes as well as aerial moments.”

This show features more individual screens than most tours these days, and Bennett says he’s grateful to have some of the world’s best screen techs out with him. “As well as the incredible media server tech, Adam Karasik. They all get these screens up, make sure they stay up, and bring it all over the world with ease. I am also extremely grateful to the folks at [Marchwinski’s firm] EarlyBird Visual for bringing me onboard and to screens programmer Kirk J. Miller for his trust in me on this tour.”

Kirk J. Miller, screens programmer

Miller says the 31 individual LED surfaces comprise three larger canvases: stage right IMAG, stage left IMAG, and an

“Katy’s show spans nearly the entire arena floor, with much of the action taking place while in motion or spanning the whole thrust,” Marchwinski says. “This creates some challenges for consistent key light and area light in general.”

upstage surface. “These individual screens are rigged at atypical angles and relationships to one another, making an interesting challenge at the intersection of the digital and physical models. In developing a content pipeline for this show, we aimed to prioritize efficiency with both content creation and the daily touring workload. We broke the visuals down into two categories: content that was meant to span the canvas, breaking the bounds of a single surface, and content that was meant to adhere to the constraints of the individual surfaces, ignoring the larger spatial picture.”

Miller knew there would be minor discrepancies between the model on paper and the real-world build. “With limited rehearsal time, we wanted to avoid re-renders dependent on the spatial relationship of the physical build. Early on, we decided to bifurcate the content pipeline to support the two categories—parallel and discrete. A parallel delivery, rendered unmasked, spanned the

entirety of the canvas and was meant for anything that broke the bounds of a single screen. This removed the need for content studios to reference or acknowledge the geometry of the build. This moved the reconciliation of spatial relationships onto the media servers, where 3D tools made daily adjustments easy." A more compact delivery template was provided for discrete content meant for drawing directly on a surface, regardless of where in the canvas.

"Within the Disguise server, we composited the parallel and discrete deliveries along with IMAG to create an immersive visual experience that could be kept spatially accurate with the realities of touring," Miller continues. "Dwain [Bennett] calibrates the surface positions daily with a series of maps, to be sure spatial relationships are correct for both content and the laser tracing moments we have throughout the show."

Markus Meyer, front-of-house engineer

Meyer, who first started with Perry on the 2021 *Play* Las Vegas residency, is mixing on a Yamaha RIVAGE PM5. He notes he's not been committed to a console brand, having used many different models over the years. "I try to choose the right console for the tour I am mixing. For this tour, I felt that the RIVAGE was the right choice. I am a huge fan of the RPio preamps; the console offers great on-board plug-ins, a small footprint, and great scene automation and timecode control that is necessary for this show."

Clair Global supplied a Cohesion PA system that consists of 16 CO12 main hangs per side, 14 CO12 side hangs per side, nine CP218 flown subs per side, six CP218 ground subs, four CO10 front fills per side, and six CP6 center fills.

Meyer uses some of the RIVAGE's onboard plug-ins for EQ and compression on input channels. "The [Rupert Neve] 5045 is a great tool to have on hand, and I use the EQ6 on a few channels for side chaining. On the Waves end, I only use the dBX 160 on kick and snares and F6s for dynamic EQ on my mix busses. Reverbs and delays are all done with Live Professor, a VST3 plug-in host. The Seventh Heaven plug-in from Liquid Sonics is my go-to here for all my reverbs, and for delays, I use the Timeless 3 plug-in from FabFilter."

"If I can avoid using a plug-in, I will," Meyer says. "Latency is a big deal for me, and one can easily get lost in today's plug-in world. I do use a few pieces of analog outboard gear for this show. Katy's vocal runs through a Neve Shelford Channel, an analog 5045, and a Summit TLA-100A. Then there is an old Manley ELOP on the bass guitar. The band mix runs through a Stam Audio SA-4000 MK3 and GML 8200, and then I have an SSL BUS+ on the stereo master that tucks in the vocal. On the PA feed, I use Tube-Tech SMC 2B, which is part of the room tuning."

Meyer says having an artist performing in front of a PA for 80% of the show is quite challenging. PA design, placement, and tuning are crucial here for this to work. "I am thankful to have an amazing team out here that makes this possible every day."

Adam Beck-Slaten, monitor engineer

The DiGiCo Quantum 5, Beck-Slaten says, has always been his go-to board choice: "I feel most comfortable with the 5's layout, large format capability, and familiar workflow. My predecessor used DiGiCo as well. When I started

a fresh file for this tour, I decided it was advantageous to have consistency on stage." Most of the instruments and vocal inserts, and all effects he uses are in-console. "I haven't found the need to add much of anything else for this tour. For my outboard racks gear, I use Rupert Neve Designs 5045 Primary Source Enhancer on the background vocals and the headset mic. A majority of the stage is in front of the PA; the 5045 helps to clean up the mixes. On Katy's mix, I have a Rupert Neve Designs Portico II Master Bus Processor, which adds extra flavor to her mix."

Perry's handheld microphone is the Shure Axient AD2s with Sennheiser MD 5235 capsules. "It checks all the boxes when it comes to vocal tone, style, and technique. It also helps us address the challenges we face with the location of the infinity thrust in relation to the PA. For her headset, we decided on the Sennheiser HSP 4. We tested a few headsets and found that it sounded the most natural, as well as providing an acceptable level. Katy's IEMs are JH Audio AFRs. The quality from JH has allowed Katy to stay on them for a long time. Jerry and his staff at JH Audio were gracious enough to make new sets of AFRs for us before the tour started.

"Katy and the band have been a pleasure to work for," he adds. The entirety of the production staff on this one impresses me daily. Every tour, regardless of size or scope, is demanding. The professionalism of the crew eases that stress. Clair Global sent out a fantastic audio team. They have been on top of their game. Our monitor/RF tech, Vanessa Gryse, has been key as well. I was grateful we could get her out for this tour." The *Lifetimes Tour* continues through 2025 with dates in the US, Latin America, Europe, Asia, and Dubai.

Katy Perry's *Lifetimes Tour* Production Crew:

Production Designers: Baz Halpin, Vincent Richards (Silent House)
Assoc. Lighting Designer: Eric Marchwinski (Earlybird)
Creative Design/Choreography: The Squared Division (Ashley Evans, Antony Ginandjar, Kaylie Yee)
Lighting Programmer: Mark Humphrey (TruCreative Design)
Lighting Director: Jonathan D. Martin
Video Director: Omar Montes
Media Server Programmer/Operator: Dwain Bennett
Screens Programmer: Kirk J. Miller (Earlybird)
Tour Manager: John Czajkowski
Production Manager: Jay Schmidt
FOH Engineer: Markus Meyer
Monitor Engineer: Adam Beck-Slaten
Production Companies:
Lighting/Video/Rigging: Solotech
Staging/Automation: TAIT
Audio: Clair Global
SFX: Pyrotek Special Effects
Props/Rigging: Smooth Technology, Michael Curry Design, Glow Motion, DAS DesignWorks, Stageworks
Inflatables: Landmark Inflatables, Airworks