# RETURN ENGAGEMENT

## U2's new tour finds new meaning for today in its classic album *The Joshua Tree*

By: Sharon Stancavage

Last fall, when the members of U2 were talking about another tour, the plan was to support its in-the-works album, *Songs of Experience*. Then the unexpected result of the US election last November made them rethink their strategy. In a widely quoted *Rolling Stone* interview, The Edge, U2's lead guitarist, said, "We just went, 'Hold on a second—we've got to give ourselves a moment to think about this record and about how it relates to what's going on in the world'."

Although work continued on *Songs of Experience*, which remains unreleased, the band members took note of the 30th anniversary of U2's breakthrough album, *The Joshua Tree.* Recorded during the Reagan/Thatcher era, it seemed to them to be the perfect fit for the social and political climate of 2017. Thus was born the current *Joshua Tree Tour*, which among other things, features the entire set list from that album.

In search of inspiration, U2's longtime creative director, Willie Williams, says, "I looked at the '87 stadium stage, which was essentially a festival proscenium stage with a painted backdrop and PA scrims; I was very keen to encompass at least a little of that spirit in the new design. A proscenium stage is so out of fashion now that part of me wondered if U2 could do something interesting to reinvent it for the 21st century—but, ultimately, the sightlines of a proscenium just don't work for today's outdoor stadium shows."

As plans were being laid for the tour, Williams and the scenic design team at London-based Stufish Entertainment Architects, led by Ric Lipson, were involved in a corporate show. "Salesforce, a corporate company, had an event in San Francisco called Dreamforce," Lipson says. "We were doing a one-night show for Dreamforce. We put together a production loosely based on the concept of a drive-in movie theatre, because the site of the event, The Cow Palace, used to have [such a venue]. The design of the Salesforce show was a big slab of video, top and tail with lights, and a basic PA system. We suddenly realized that this was a really beautiful thing, which we knew, because we had a big video screen for the *Innocence + Experience Tour* in 2015."

The idea resonated, and the design team decided on a 200' curved LED wall comprised of ROE Visual CB8 8mm tiles. Lipson says: "It would have been easier to build a big, flat 200'-wide video screen. But the curve allows the stage to be inset into it and this gives us the effect of feeling a bit 3-D." Williams says he likes the curved stage because "I'm always keen to get the performers as close to the screen as possible."

The 200' wall, which was provided, along with the rest of the tour's video gear, by the Los Angeles office of PRG Nocturne, includes a scenic header. "We [Williams, Lipson, and creative consultant Es Devlin, who was involved in the early stages] all felt that a plain rectangular screen wouldn't have been worth getting out of bed for, so the idea of exploding the frame was appealing," Williams says. "We started out having the outer edges be irregular but, eventually, it became obvious that the tree should grow out of the top."

Lipson notes, "The integration between the video screen, lighting, and scenic is done in such a way to get the most minimal impact on each of them but the maximum effect of all of them coming together."

Photo: Danny North

Floor lighting is a key component of Williams' lighting design.

Photo: Danny North

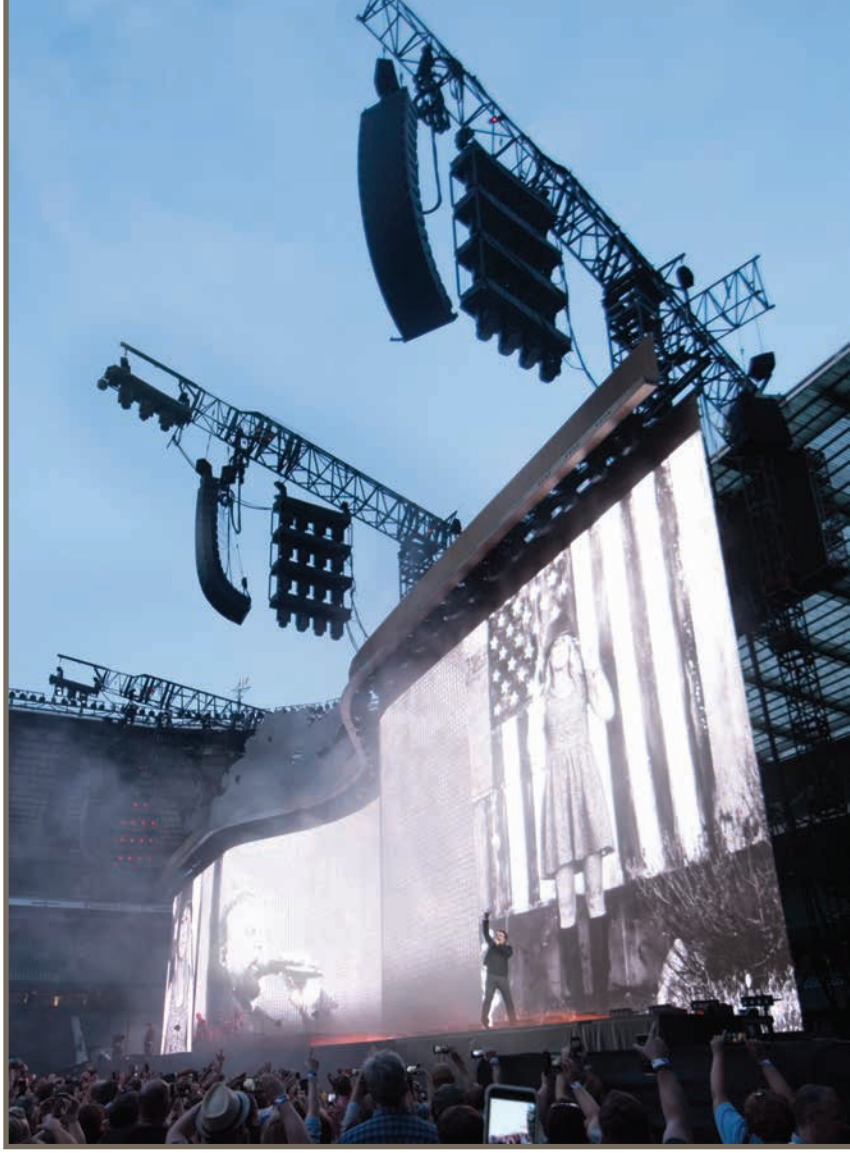
Even when not in use, the LED wall is visually tied to the *Joshua Tree* iconography, Lipson says: "We looked back at the 1987 show, which had a big gold scrim with a black tree painted on it, and this became the obvious motif of the show. We decided to make the LED screen a color other than black. A black screen is very simple, but we wanted to own this slab of video as an object, not just as a screen."

Making a video wall a color other than black isn't a simple matter. "We bought a black screen," Lipson says. "It is made out of 1,100 video tiles, and there are two tiles in a frame, so there are 550-and-some odd frames that create the whole wall." Inside each video tile are eight smaller tile components; each has a shader, which, Lipson describes as "a louvered plastic piece, with holes in it, that sits on the front of the LED circuit board and stops the sunlight from hitting the LEDs. It helps with the contrast of the screen." (See page 58 for more about SPACEFRAME, the PRG-developed product that holds the screen together.)

Lipson adds, "We decided to remove the shaders [which are typically black]; it was time-consuming, since each small 6" x 12" tile has 64 screws. We took out all the screws, which comes out to something like 1.5 million, and had special gray shaders made. These were sprayed gold, and the silver tree was painted on top of the tiles that needed to be silver. We also screwed shaders to the tree header to make it consistent with the screen." For the walk-in and the first act [which runs about 25 minutes], there is a silver Joshua tree on a massive gold screen.

"At the end of the tour, you take two million screws out take of the painted shaders, put the black ones back on and put it back into rental stock," Lipson says. The process was labor-intensive but worth it, he adds: "We could have just turned the pixels on and made it a gold color, but when you photographed it, you saw a horrendous moiré. And it's not an honest statement."

The screen is purposely unobscured; there is no PA hanging in front of it, nor any light towers, Lipson says: "We have a 200'-wide screen that is 45' high, but, as with most shows, the last thing you want is the silhouette of the PA right in front of it." Williams adds that production manager Jake Berry "was determined that it must be possible



From the front, the video wall looks flat at times; when viewed from the side, the curve gives the video content a three-dimensional feel.

to cantilever the PA to get rid of the towers. Of course, having got rid of the towers, I had to find new lighting positions, too, so it became a bit of a big deal, but Jake really saw it through. We couldn't have done it without the whole team on board with it."

Thus, four massive cantilevers, fabricated by Stageco [located in Tildonk, Belgium] trim the PA at 80'. Stageco also provided the steel and sub-decking. "The stage consists mostly of rental items, with a few custom bits," Lipson says. "The PA, all the lighting, and all the sort of kit that we've become accustomed to seeing in front, or wrapped around, a screen was disassociated from the slab, being hung above the screen." Williams adds, "A lot of people have commented on how pure and singular the show feels, and it's a lot to do with the giant images being completely unobscured. It's not something that you notice at first, but, for those of us who have struggled with these things for decades, it's incredibly refreshing not to have all the usual ugly junk interrupting the visuals."

The 192'-wide stage was fabricated by Lititz, Pennsylvania-based TAIT; it sits on top of a Stageco 900mm sub-deck. Lipson notes that a prop lift is built into the stage, adding, by way of explanation, "Because we have a warm-up act, we have to be able to get rid of the U2 rig easily. Left and right of that, located under the stage, we have the bunkers, where the guitar, bass, and keyboard techs are."

The main stage is accompanied by a 120' thrust that leads to the massive, 55'-wide B stage. "U2 literally invented the B stage [for the *Zoo TV Tour*], and it's become part of their performance language ever since," Williams explains. The catwalk and B stage form a Joshua tree, acting as a kind of reflection of the tree built into the set, although, Lipson says, "It's not a true 100% reflection; to have built it that big would have been insane."

He continues: "The B stage is made mostly out of rental decks, but, to get the tree to stick out from the edges, we had to make quite a lot of custom decks that follow the tree edge. It has two lifts in it: one for the drum kit and one for the keyboard."

The running order for the show, which begins with "Sunday Bloody Sunday," was intensively discussed. As

Photos: Courtesy of Stufish

The cantilevers are used for the Clair Cohesion PA and also for lighting positions.

Lipson explains, "If you start the show with the *Joshua Tree,* just practically speaking, it's still light out. We decided that you can't really start the show with ["Where the Streets Have No Name," the first song of *The Joshua Tree*] in the sunlight." Williams says he created a number of set lists for consideration. "Early on, I presented eight variations of how a show like this could run: Open with *The Joshua Tree*, close with *The Joshua Tree,* put it in the middle, make it chronological, make it thematic, etc. Everybody picked the version that we're doing now. We felt that we really mined [the albums] *Boy* and *October* on the last tour, so preceding the main event with songs from *War* and *The Unforgettable Fire* [albums that directly precede *The Joshua Tree*] felt much fresher."

*The Joshua Tree Tour* is presented in three acts. Williams says, "Act I sees the band on the B stage, playing to a stadium full of people [accompanied by] no visuals whatsoever. There's no IMAG, no content, no screen; just simple lighting and enormous sound. This is to evoke the original *Joshua Tree Tour* and to remind the world that U2 does all this extraordinary visual stuff not because they need it as a crutch but simply because they want to. The screen reveals itself as we begin Act II, which is *The Joshua Tree*." The third act, which is essentially the encore, features seven songs, including "Miss Sarajevo," "Beautiful Day," and "Elevation."

Williams says, "We all enjoyed the notion that U2 would open for U2. We would kick off the show by being the U2 that used to play midway through a festival bill and just kill it with no production at all. Then we'd switch on the big telly and present 'the High Mass of *The Joshua Tree*,' as Gavin Friday [executive director and band consultant] called it." As the sun goes down on the golden wall with the silver tree, the massive screen comes to life. Lipson says, "We're playing poetry on the screen, during the end of 'Pride,' and then those words expand out and turn into the big red slab with a silhouette of the tree, which has, iconically, become the U2 motif to start 'Streets'."

## Video

"It was obvious from day one that Anton Corbijn [who took the photos for the original *Joshua Tree* album] should make the films for *The Joshua Tree* portion of the show—it's his aesthetic and he found the damn tree, after all," Williams says. "In Act III, there's a film by the French artist JR about Syria [for the song "Miss Sarajevo"] and a couple more things made by me and my usual team, which includes Sam Pattinson, at The Third Company, and Ben Nicholson, at Empirical Studio."

Video director Stefaan "Smasher" Desmedt says, "I spent two months configuring *The Joshua Tree*'s video system with the guys from PRG Nocturne, so that it would be actually tourable. It's not just a normal, conventional video system." The combination of its extreme width and 8mm resolution poses many challenges, he notes: "A lot of people make a mistake—they end up with this super high-resolution screen, but there's no money for the back end, like cameras and visuals. If you shot this in just HD, you

Photo: Ross Andrew Stewart


would have to stretch the image four times, and by then you'd be able to play chess on it, since it would look so digitized and ugly. There are not many tours that are taking 4K, because you don't need it—but we needed it because of the resolution of the screen."

"It was pretty hard to get the package together," Desmedt continues. "You can do 4K, but then your server needs to do 4K as well, and that was the biggest problem. The reason, again, is because none of the servers out there can input 4K signals yet. Well, technically, they can, but you have a latency of six frames, which is too much for what I do out here. I went to Ash Nehru [director of d3 Technologies]. He's a good friend of mine, and has supported me for the last 12 years on all the U2 shows; I


Above and top: Stufish renders; note the shape of the B stage, which is designed as a reflection of the tree header.

Images: Courtesy of Stufish


The content comes from a variety of sources, including filmmaker Anton Corbijn, who created the original imagery for the album *The Joshua Tree*. A 120' thrust leads to the B stage, which is comprised of both rental and custom deck pieces from TAIT. Opposite: The effected IMAG—and all video content—is handled by the new d3 Technologies gx2 media server.

wouldn't go out without his system."

Nehru and d3 technologies had a solution in mind for Desmedt. "I have a d3 system that's actually not on the market yet, but is a prototype that ingests everything and spits it out to the screens." Hans Beijer, VP of sales at d3's Brooklyn-based d3 US office, adds: "Smasher and U2 took delivery of a pre-shipped set of d3 gx 2 machines [the company's newest product] in March '17. However, this is a modified product, where the PCIe expansion card is installed and activated."

"The PCIe card on the gx 2-specific machines are connected to a Capture expansion 1U box. This enables the system to capture two 4K camera inputs at 60Hz and directly take them into the system. By taking multiple capture cards into the server through a PCI bus connection, multiple 4K canvases can be captured simultaneously, without increasing latency when compared to the standard capture cards already in use throughout the d3 product line."

Desmedt notes: "I've always been the test pilot for d3; I've always had prototypes and I try to push the limits in regard to technology. That's why I use d3." The final version of the gx 2 started shipping starting July 1; it does not have the PCIe expansion option, which "is in further R&D at d3's London headquarters," Beijer says. "Our road map includes expansion for both capture and storage, but we are limited to components currently available to market, so this needs a bit more time."

Working with the gx 2 is Notch, the popular plug-in that combines live imagery and content with minimal latency. Desmedt has been using it since he first saw it, in demo form, two-and-a-half years ago. "In many ways, Notch is an empty box that you can use to create amazing things," he says. He's using Notch, to add light texturing to the IMAG, along with a delay effect during the number "Exit."

Desmedt adds, "All the footage was shot in 8K as well, because of the resolution of the screen. Anton Corbijn changed his cameras around as he was shooting, and the result is just amazing." For live imagery, there are eight Grass Valley [a Beldon brand] 4K LDX Series manned cameras, as well as six unmanned cameras.

Unlike many directors, Desmedt is located at the front of house during the show. "When I'm directing, it's so much easier to follow the show and get the energy of it, as opposed to staying backstage," he admits. He's on tour with two system engineers: "Once you take that kind of

Photos: Courtesy of Stufish


Williams' color palette is bold, and lighting positions within the stadium allow him to transform the entire space.

Photo: Danny North

risk, you have to make sure you have the support as well. The guys worked extremely hard for me to get this thing going, and it was a big risk."

## Lighting

"As ever, I completely f---ed myself with lighting positions in the quest for visual purity," Williams says. "Consequently, the lighting positions are few, but each is very effective. There's a rig of 16 PRG Bad Boys [on four

short, ladder-like trusses holding four lights each] behind the PA on each of the four cantilevers, and there are full-length rows of Bad Boys at the top and bottom of the screen. There are lights on the four delay towers, and there are six high platforms in the highest seats of the stadium, spread around the building."

Williams adds, "The entire moving system is Bad Boys—about 200 of them—mostly HPs. The throw distances are so enormous that every fixture counts, so each unit has to be as bright as humanly possible. On previous tours, I've used a mixture of washes and spots, but, this time, it's all spots—there really wasn't any need to do otherwise."

Williams comments, "Aside from the movers, there is my usual selection of analog antiques: [Martin by Harman] Atomic strobes with scrollers [49 on the floor, directly upstage of the Bad Boys], [eight Hubbell Lighting] sodium fixtures, [six] HungaroFlash [T-Light Pro 85Ks spread out on the floor, downstage of the Bad Boys] and—very proudly—four hundred DWEs," he says. The DWEs are TMB ProCan units; also used, in overhead positions, are 48 Chroma-Q Color Force 48 LED battens. Lighting gear was supplied by the LA office of PRG.

Bad Boys are also featured in PRG's GroundControl followspot control system. "I used the first two GroundControl units on the last U2 tour and it's just a complete no-brainer," Williams says. "Everybody finds a huge advantage in them; design-wise, you can put spots in places where you can't fit a human. The crew chief loves not having to winch into the air burly men in yellow T-shirts, production loves not having to have all the harnesses and safety gear, and the band loves being able to use truss spots at sound check without having to wait half an hour to load operators. The new Longthrows mean you can also get rid of the giant baskets on the front-of-house towers. There's really no downside to them at all."

Spotlights are managed by lighting director Alex Murphy, who says, "There are 11 high-output and nine Longthrow Bad Boys being used for spotlights. We have 17 operators who switch between all the various units." Williams explains: "Operators can change fixtures, depending on where the band members are, for any given song." The fact that GroundControl operates with cameras is beneficial at the front of house, Murphy says: "Having a feed to my console from the cameras mounted on the GroundControl really helps me to see if the operators are ready on their mark before I call them in. I have a quad split screen next to me, and I can switch to which operator's camera POV I can see during the show."

Also, Williams notes: "A screen this large puts out such a huge amount of light that it naturally affects the camera pictures, therefore re-affecting the screen brightness in a vicious circle. We had no alternative but to program everything together as one team—it takes a lot longer, but pays dividends immediately. We always do the video and lighting programming together—it baffles me completely that anyone would attempt to do otherwise. I realize that it is absolutely the norm for video and lighting teams to work separately and program their shows in isolation—hence

the traditional car crashes and fistfights when all is put together for the first time."

Williams brought Allen Branton onto the team to oversee lighting the IMAG: "Lighting 57-year-olds for a 50'-tall 8K screen requires a very great deal of care, so Allen's involvement has made the results much more consistent from day to day. Alex's work has also been crucial, metering the key spots during each focus in a similar way to what would be done for broadcast," Williams says. The bulk of the rig is handled by lighting director Mark "Sparky" Risk. The production uses three MA Lighting grandMA2 full-size consoles and one grandMA2 light. Atmosphere is provided by four Hazebase base*touring foggers.

While some lighting designers create intensely cued, visually overwhelming productions, Williams has a different philosophy: "I don't think any show I've ever done could be described as 'intensely cued.' I'm very much in the less-is-more camp when it comes to running a show: Build something very strong and confident, then give the audience time to look at it." Bold swaths of color bathe the band—for example, red at the beginning of Act II and a lovely mid-tone blue that floods the stadium during "Pride."

Williams adds, "Production time was very tight. We had ten days in Houston for a tech build and programming, then joined the band in Vancouver for ten days' rehearsal. Houston was somewhat hampered by half of the screen being a week late, which is a pretty big deal when you've got eight days of programming, so Vancouver was a bit of a scramble."

### Audio

Front-of-house sound engineer Joe O'Herlihy is touring with a Clair Global Cohesion PA system. He notes, "I first got to know it on the *Songs of Innocence + Experience Tour* in 2015-16. The one thing that shocked me about it was the absolute clarity and intelligibility in the vocal range; it was something that stuck with me."

As mentioned earlier, the PA is integrated into the overall show aesthetic, being suspended, with some of the lighting rig, above the video screen via four cantilevers. "This design gave me a clear and uninterrupted trajectory into the stadium itself," O'Herlihy notes. The bottom PA cabinet trim height is 53', which is consistent with what he has done for the band's past stadium tours. He says: "For the 2009-11 tour of stadiums, we had the Clair i-5/i-5b system flown at a trim of 55', which was also to the bottom PA cabinet."

This time out, the main PA hang is comprised of four cantilevered hangs of 16 Cohesion CO-12 cabinets, for a total of 64. "This gave me a perfect center image mix with left and right, with an 84' distance between them, and then a further 50' between the offstage left and right," O'Herlihy says. "It is an incredible spread, which ended up being very dynamic in its SPL level. I have my power alley, which is the central system playing down the center of the field towards FOH, and I have my very accurate trajection left and right on the offstage system up into the stands, to cover all of those immediate areas."

He adds: "We use all Cohesion CO-8s for front fill; they're basically hung from the front elevation of the stage. We have 16 of them going across the entire stage and the ramp as well, so there's an immediate impact with the audience that is in that area." Thirty-two Cohesion CP-218 sub bass cabinets are placed on the ground.

"We also introduced a Cohesion delay system for this tour. We have two locations of eight CO-12s and two locations of six CO-12s, in an arc formation. The placement of the delay is directly behind the front of house, and the system is mathematically time-aligned to work at its optimum in that configuration; we also have continuity in the intelligibility, in particular, and in the sonic value of the system distribution. We had a similar delay system for the 360° Tour, but the delay system box back then was the Clair iDL."

System engineering is the key, O'Herlihy says: "We pay particular attention to acoustically mapping each venue. We get them in 3-D computer models from which we generate an accurate simulation of each and every stadium to a starting block position. I've been doing this for many years, and my day-to-day routine has changed so much. Now you have the opportunity for a good starting position with the technology that we have; it makes what we do much quicker. Normally, you would take anywhere from four to six hours to tune a system; we're now doing it in two to three. That's quite a substantial change."

At the front of house, O'Herlihy is again working on a DiGiCo SD7 console, notably still without plug-ins. "All of those wonderful devices replicate what I physically use," he says. "I've been using the same [Summit Audio] DCL-200 compressor/limiter for Edge's guitars for 20-odd years; now you can get a box of Waves that will give you exactly the same thing, but they're replicating what I use already. I still use the Lexicon 480L [digital effects processor] and Eventide H3000-SE [signal processor]. My drum reverbs are on Lexicon PCM70 version 2.0, because it's the best drum reverb that I've heard and it travels well; it bounces around in the truck every day, and you turn it on and it still works.

"I use a Manley VOXBOX [vocal processor] as a box of tricks for Bono; it matches his sonic value quite substantially, and it's a very natural transparent transition between the device and his voice." For Edge's vocals, he uses Avalon VT-737sp compressor pre-amps.

As for microphones, "I have a Shure Beta 58A for Bono," he says. "We have a half-dozen of them and they're rock-solid, even though he does his best to trash

PRG Bad Boys line the top of the screen and the floor upstage. City Theatrical's SHoW DMX Neo Wireless DMX is used to send wireless DMX data to high platforms, located around each stadium, on which are placed PRG Bad Boys, for audience washes, and GroundControl Longthrow followspots.

Photo: Courtesy of Stufish

them every now and again."

The Edge is on a Shure Beta SM54. "He wears a headset microphone, because he moves around the stage quite a lot; it's been remarkably good. There are much more sophisticated units on the market these days, and it looks a little bulky and ugly, but nobody can ever say he's not singing. He also has a standby which is a regular Shure Beta 58A RF."

There are two full drum kits—one each for the main stage and B stage—with identical mic packages, O'Herlihy says: "The kick drum is a Shure SM91 on the inside; outside is a Shure Beta SM52. The snare top and bottom are Shure SM57s, and I also have a snare rim microphone, a Shure SM98, which is a clip attachment to the actual rim itself." For the hi-hat, he has an AKG C451 B, while the rack tom and right and left floor toms are all Sennheiser MD421 IIs. He adds, "There are three overheads, which are Audio-Technica AT4050s. I also have a ride cymbal, which is a Shure SM81." Shure SM57s are used for bongos, piccolo snare, and percussion.

The vast majority of the band gear, including most of the guitar cabinets, lives under the pristine stage. "Edge hears everything through his in-ear monitoring," O'Herlihy says. "However, we have two standby reference amps [a Fender and a Vox] onstage if he needs to listen to anything specifically without his in-ears in." The amps on stage are controlled by The Edge himself.

Speaking about the under-stage amps, O'Herlihy says, "I still have the same sort of noise threshold and air environment as they would have on stage. What's better for me is that I don't hear wind or anything else that can have a substantial impact on the tonality and sonic quality. It's an improvement."

Considering all the daily variables that go along with presenting U2 live, O'Herlihy reflects on the rewards: "I've been doing it for maybe way too long; I'm in my 39th year with the band." As Bono said from the stage the other night, "I think I was 16 or 17 years old when I met that guy out there doing our sound and he's been out there doing it ever since." The audio crew working alongside O'Herlihy includes crew chief/system engineer Jo Ravitch; assistant system engineers Joel Merrill and Tim Peeling; RF monitor systems engineer Niall Slevin; stage engineer Brandon Schuett; and PA technicians Mike LaCroix, Pascal Harlaut, Hannes Dander, and Ann Butt. The band's monitor engineers, Alastair McMillan, Richard Rainey, and CJ Eiriksson, each operate their own DiGiCo SD7 monitor consoles during the show.

*The Joshua Tree Tour* is in the US until September 22, before moving on to Central and South America. "It's a beautifully holistic show in which all the departments came together to make something that is genuinely beautiful," Lipson says. "And, as U2 has always done, they have once again redefined how you do a stadium show."

The colored video shaders and the header, in rehearsal.

# IN THE FRAME

"For the U2 tour, PRG proposed the latest ROE Visual LED wall, the Carbon CB8. This is a new ultra-light, 8mm LED panel," explains Frederic Opsomer, managing director of PRG Projects, based in Ostend, Belgium.

CB8 panels have to be constructed—and are generally transported—in rental frames, which, Opsomer notes, "are made to make the setup time, transport, and handling workable for touring. The downside is that they add a lot of weight to the LED panels, which, in turn, have become lighter and lighter. At PRG Projects, we were playing with the idea of developing a rental frame, following the downward curve of weight."

Working with PRG Projects on what became the PRG SPACEFRAME project was the team at London-based Atelier One. The firm has worked with U2 since the 1994 *Zooropa Tour*; it began partnering with Opsomer during the *PopMart Tour*. This time, Opsomer says, "Atelier One oversaw the engineering calculations and were instrumental in defining the type, size, and specification of the carbon fiber used. Since this is the first-time use of this material and its form factor, a close collaboration with an engineering company was of the utmost importance."

PRG Projects outlined the overall goals for Atelier One. "We needed to create a structure within the LED rental panels to not require any further storage space in transport dollies, thereby saving on trucking and air transport costs," notes Neil Thomas, the company's director. "We also needed to keep the weight of the structure down so the panels could be comfortably handled and rapidly installed by a rigging crew. Atelier One proposed carbon fiber for the structure, which is stronger than steel but is one-fifth the weight."

Opsomer continues: "The frame incorporates two hinging carbon fiber elements that form a spine when deployed. The panels latch together vertically and horizontally with customized DESATCO latches." Using chords—horizontal and vertical elements—with the SpaceFrame has structural advantages. Thomas adds: "The three-dimensional SpaceFrames are far more efficient due to keeping down the length of individual chords to avoid buckling. By combining this principle with the unique strength and

lightness of carbon fiber, the design goals were met."

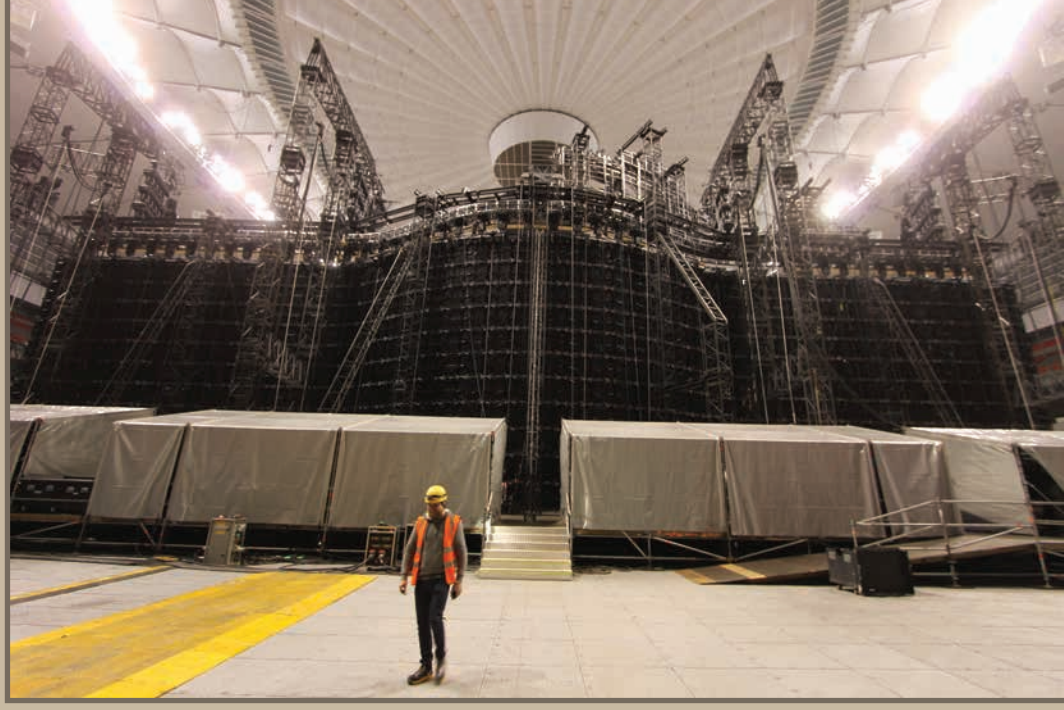
With the SpaceFrame, each CB8 panel is approximately 4' x 4'. The weight, including the LED panels, is 7lb/sq. ft. "The PRG SpaceFrame also has an adjustable angle system that connects the panels horizontally, which enables them to be curved," Opsomer adds.

Although the panels are part of the massive horizontal wall for the U2 tour, Opsomer says there are other uses for them. "They now have full structural integrity and can also be used as video roof structures or moving objects on stage. This concept opens many creative new avenues."

On the road, the PRG SpaceFrame/Roe CB8 panels travel eight in a dolly. "The transport depth of a panel is 15% less; the conventional systems carry six in the same space. This reduces transport volume by 25%," Opsomer says.

The frame also includes built-in wind bracing. Opsomer notes, "Wind bracing has become a very time-consuming operation for these large-surface video screens, and is usually made from heavy trusses or beams that are transported with the steel structures. With the PRG SpaceFrame, the wind forces are transmitted through the hanging brackets and stack locks to the towers of the stage. The combination of the panel and the spine makes it a rigid structure, capable of dealing with wind loads." U2's video director, Stefaan "Smasher" Desmedt, who works with the panels and frames every day says, "The wind bracing structure is in the frame itself, and unfolds as you're setting it up. It's super-light and is quite amazing."

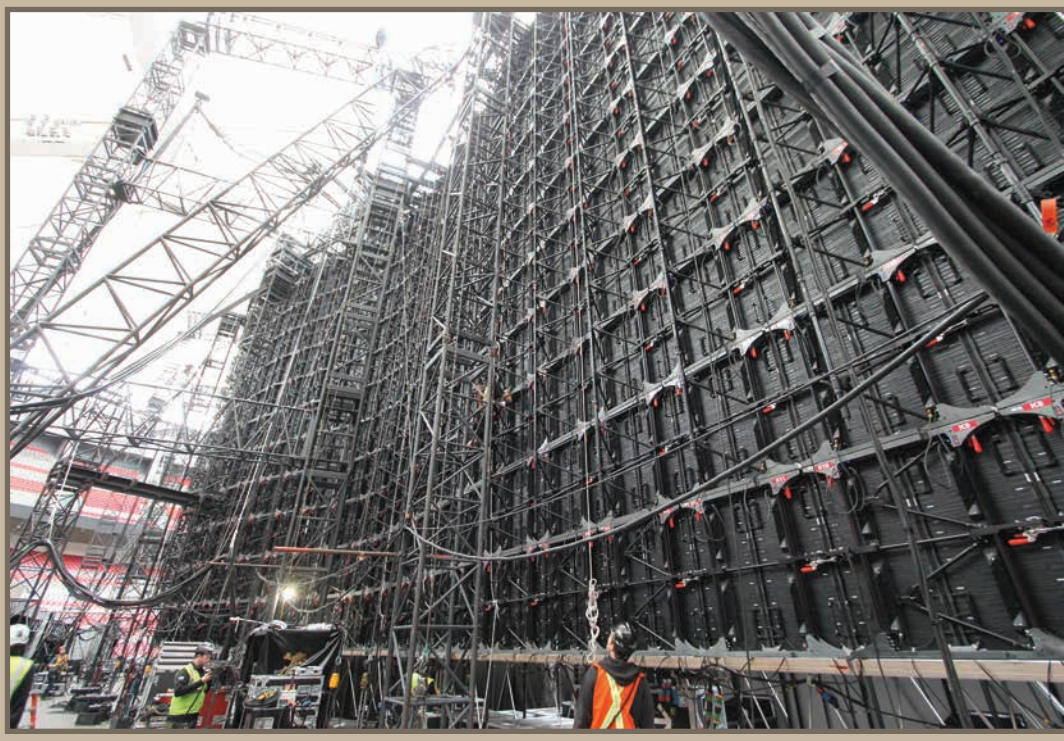
Desmedt adds, "We had a big storm in Tampa the day before the show and the wind bracing definitely did its job." As for the product's roadworthiness, he says, "I've been very happy with its performance; it goes up and down very easily, and that makes your crew happy as well."



A different view of the curved screen, while the cantilevers are being built.

The project took place over a mere three months. "Without question," Thomas says, "the single biggest challenge was time. However, Frederic worked tirelessly to support both his own design team, our engineering team, and the manufacturer, constantly encouraging and inspiring them in the mammoth task."

Opsomer says. "With the help of the PRG team around us in many different locations and continents, we were able to make it happen in an unbelievable short time span of 14 weeks, from start of development to end of delivery. The entire company has embraced this project—top management as well as the people loading the trucks—with an unparalleled enthusiasm." **—Sharon Stancavage**



The back of the screen, with the SPACEFRAME wind bracing in place.

Photos: Courtesy of Frederic Opsomer