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Cirque du Soleil meets The Beatles in the psychedelic new spectacle called LOVE

By John Huntington

Marmalade

SPECTACLE/CIRQUE DU SOLEIL, FART I





Opposite: "Here Comes the Sun." This page, top: "Characters." This page, bottom: "Strawberry Fields." "I loved the show; it was like my dreams!" said an exuberant audience member, mistaking me for a Cirque du Soleil employee in the lobby after a preview of *LOVE*, the new Cirque production, which opened at the Mirage in Las Vegas in June. It's a good indicator that the latest permanent show from the prolific French-Canadian troupe will likely be yet another hit.

Like KÅ, Cirque's last permanent show in Vegas, LOVE is very much a 21st-century production, one that couldn't really have existed until entertainment technology had matured to this point. However, LOVE also represents a return to Cirque's traditional, nonlinear, abstract approach, while simultaneously revealing another aspect of the company's style. Cirque's trademark acrobatics, trampolines, and physical feats are all here, of course, but, in LOVE, these elements are integrated with more traditional dance numbers; an incredible, immersive sound experience; and stunning visuals. It's different from what many Cirque regulars might expect, but they may be pleasantly surprised, especially if they're Beatles fans-and who is not?

Beginning with sound

With sound playing such a critical role in this show, Cirque turned once again to veteran designer Jonathan Deans. For *LOVE*, he has created a groundbreaking design capable of delivering immersive sound in a way few have ever experienced.

Deans has designed Cirque shows for nearly 15 years; by the opening night of *LOVE*, he had spent nearly three years on this production alone. "They approached me before the director or any of the other designers were hired," he says, "and asked me to travel to England with [director of creation] Gilles St. Croix to discuss ideas, because many of the questions from [The Beatles' management company] Apple [Corps Ltd.] were about sound. We found that we were able to work with Sir George Martin and [his son] Giles Martin, and, therefore, would have access to The Beatles' masters. There was discussion about whether or not there should be any live musicians, and I think everyone came to the conclusion that, because of our access into the masters, it could be done with [just] The Beatles."

Creating the soundtrack

With everyone onboard, Giles Martin began work on the soundtrack, using the original Beatles master tapes in a specially secured room in the legendary Abbey Road Studios. People remember the pioneering sounds of The Beatles, but they may forget the technological limitations imposed on the group and Sir George Martin, who were often recording on one- or two-track tapes; this meant that effects were consolidated and bounced down from one track to another to get the heavily layered sounds for which The Beatles were known. "We were dealing with old recordings that might have everything together on one track," says Deans. However, for some songs, "they had the old bounce recordings still available. So suddenly you can get a better, wider approach."

The selection of songs and sounds that make up the 90-minute, intricately detailed mashup of a soundtrack, was, according to Deans, "a collective decision made by director Dominic Champagne, Sir George Martin, Giles Martin, the remaining Beatles, Yoko Ono, and Olivia Harrison [George Harrison's widow]. They all had ideas and opinions, and the process was spearheaded by Dominic Champagne, because, in the end, he had to make a production." Giles Martin took the song and soundtrack sequence, and created 32-track Pro Tools sessions, mixed into a 5.1 monitoring format, to be used as a starting point for the mixing process in the LOVE theatre. The hard drives containing the sessions were brought in and stored in



SPECTACLE/CIRQUE DU SOLEIL, PART I

multilitie

the Mirage under high security. "We built the vaults," laughs Deans, "but I have never even seen the master drives."

Studio people often have a difficult time transitioning into live audio but, explains Deans, "both [Pro Tools mixer] Paul [Hicks] and Giles were really good with dealing with the learning curve of an auditorium as opposed to a studio, and it was a huge transition. This was especially true for Giles-he had been in a 10 x 10' monitoring suite for nearly two years, and he went from that to a huge auditorium; that change is quite shocking." The 5.1 mixes created by Martin at Abbey Road were remixed in the theatre using the second largest Pro Tools system in Nevada (only Celine Dion's is bigger). Typically, the team started with the 32 tracks in Martin's 5.1 mix, then took each of the original tracks out of the 5.1 mix and into the speaker system in the theatre. This process, according to Deans, took about two hours per show minute, making for 180 hours of mixing in the theatre. Deans says he enjoyed the sessions immensely: "We would work from midnight until 5am, and they would make the whole place secure-they would lock it down because we were soloing original Beatles tracks. We had so much fun-it was the best."

While the mixing sessions were certainly fun, they were not without stress, however. "Sir George Martin and Giles Martin make this music," explains Deans. "My job is to create how the audience is going to listen to it. And there was a huge weight on my shoulders, because it was The Beatles' music, and everybody has an idea of what The Beatles' music should sound like, or they know what it should sound like." Important visitors also raised the stress level. "It's very strange sitting in the room," adds Deans, "and Paul McCartney has been arranged for a listening session. And he says 'OK, let's go, let's play 'em'. There was much apprehension going on there, because you have Sir George and Giles going, 'God I hope he's going to like this one-he hasn't heard this bit because it had been changed.' And there's me going, 'God I hope it's how he heard it, how he remembers it in whatever systems he's been playing back for the last 30 years.'"

The completed 32-track Pro Tools sessions were transferred to Magix Sequoia using MADI over an optical fiber cable. Using Sequoia, the soundtrack was chopped up into musical chunks useful for rehearsal and performance, and these chunks where then loaded into main and backup Tascam GigaStudio systems, which actually play back the audio files during shows. The GigaStudio, in turn, is controlled by a Realtime Music Solutions Sinfonia system, which is designed to enhance the sound of an orchestra; it can follow a conductor's tempo and respond to constantly changing musical nuance during live performance.

One of the bigger challenges of the LOVE soundtrack is the fact that the tempo and structure of The Beatles' music, with every nuance known in excruciating detail by millions of fans, cannot be varied, while the dangers inherent in the Cirque performance style demand flexibility. The approach created by Deans and his team offers as much flexibility as possible in some very novel ways. One key to the flexibility is the Sinfonia system, which is designed for live musical performance as an orchestral enhancement system, capable of supplementing live musicians in a tempoand pitch-agile way, with a single musician performing any number of orchestral parts. It can be conducted beat by beat, or used with preset tempos, and it's used in the pit on many Cirque shows. On LOVE, however, Deans says, "We don't use Sinfonia to change pitch or tempo. For us, it's just a sequencer to handle these massive sample files, and to be able to jump around in the show, should we need to in an emergency, or should we have to play an emergency track if something happened."

"The rhythm/tempo of the music is defined by Ringo, not by the sequence tempo," explains Gavin Whiteley, who performs the soundtrack each night. "We found Gavin," explains Deans, and "he's a sound guy who happens to have a Master's in music on keyboard, so he's a great match." "In essence, my position,"



Opposite: "Being for the Benefit of Mr. Kite/I Want You" features a daring display of acrobatics, as does "A Day in the Life"

Whiteley explains, "carries a similar responsibility to the musical director on other Cirque shows. However, since all the music heard in *LOVE* comes from The Beatles, there is no live instrument played during the show."

"During the show," says Deans, "we will never stop a song, unless someone is being squashed. But for rehearsal purposes, and for the transitions in the show, we needed the flexibility to go now from the second chorus, or from the first chorus, etc. So, between songs, there are links. Some are built-in and some [in the case of emergency] are for when it completely stops and goes silent, and they make an announcement." Seamlessly looping the pre-recorded soundtrack in musical ways was a major challenge. "A 'vamp' can be programmed in Sinfonia," explains Whiteley, "that will jump to another part of the sequence, at precisely the right time, to repeat a section or play a different section. In the latest Sinfonia software, each vamp can be activated or de-activated while the



Above: Lighting, projection, and staging all blend in "Hey Jude."

sequence is running—like switching the tracks after the train has left the station. If something happens that will require the music to adapt, we will have little or no advance warning. Sinfonia's response time is lightning-fast."

These loops can offer unique experiences for Beatles fanatics in the audience. "All possible loops have been approved by Giles Martin and Sir George Martin in advance," Whiteley explains, "ensuring that even when the music has to adapt to the action on stage, it has the seal of approval of the show's musical directors. On the night of the gala opening, with all the [surviving] Beatles and their families sitting together, we needed to extend the music at the end of 'For The Benefit of Mr. Kite' because of a delay in the automation system. This music is based on 'I Want You (She's So Heavy).' Instead of looping the music again, we played out an extra 90 seconds of 'I Want You' that we had transferred from The Beatles' master tapes, but is normally not used in the show, and not available on any commercial recording. So the entire cast and audience that night-including the surviving Beatles-heard what amounts to an unreleased 'bonus track' through Jonathan Dean's sound system!"

The sound system

The design of this massive, complex sound system was driven by a desire to offer a unique experience. "There's no point in doing this," explains Deans, "if you can buy the CD, or the 5.1 mix, put it into your home theatre, and have the same experience you can have audibly in the theatre. The same is true if you film it—it's not the same as being there. And one thing we know is that Cirque really cares about their sound—they care about all aspects of their project—not just the visual."

The 32 outputs from the Sinfonia/GigaStudio playback system head into what would have formerly been known as an LCS System, but is now called the Meyer Sound "LCS Series." This Matrix 3-based system has 88 inputs, 64 internal busses, and over 280 outputs. Deans says that the flexibility and multiuser access offered by the Meyer LCS Series was critical to the success of the show. For a production this complex, "you couldn't drag a [conventional] board around or be talking [to the operator] on the walkie-talkie. Thank heaven, with the [LCS] Cue Console, we can walk around and make changes from our laptops. We could go to any seat and deal with any loudspeaker dealing with that area, and adjust it at any time-even during the previews. I was doing that and

[assistant/programmer] Leon [Rothenberg] was doing that, because you can have many people working simultaneously."

"When I sit down and look at plans," says Deans, "I'm imagining myself inside the plans listening to music. 'Okay, so I'm sitting there, how does it feel; am I in the range of that speaker?' It's a virtual design inside my head, as I'm going through this. Surround was easy, because it's in the round, and I also had balconies to deal with and so on. But the big problem was the main system. When you're in 360° and you have video projectors firing across from one side of the auditorium to the other, and projection screens coming in and cutting the room into half and into quarters-and you're working with Cirque-the grid is so high because you have aerial performers. So, as soon as you start splitting everything wide enough to give you left/right coverage at that height, you're actually feeding the other sections of the auditorium. It was really, really complicated." The system is so complex, it's difficult to describe. When questioned in a press conference, Deans says the best way to describe it would be as a 25.5 system. "In a minimum layout, it's 25.5," he adds, "because it's layered and it's different [from 5.1]."

In the end, the 280 outputs from the console drive 6,341 loudspeakers. No, that's not a typo; *LOVE* has more than

6,000 loudspeakers. "[The system] may look excessive at first glance," explains Jason Pritchard, head of audio for the show, "but, after getting involved with it for a while, one soon realizes that it's just what it needs to be. Jonathan pushes the limits of what is possible, and that doesn't scare these producers. It fits really well with both The Beatles and Cirque."

Each of the 2,013 seats in the LOVE Theatre has three loudspeakers, which were custom-manufactured by Innovox: two in the headrest facing towards the patron's head, and one in the back of the headrest facing the row behind. "I split them into 22 [seating] zones," says Deans, "so I use 66 outputs to run the seats." All those seat loudspeakers need a lot more testing and maintenance than a standard sound system. "I have two technicians working constantly with me to test and repair the seat loudspeakers," says Brad Ward, LOVE's lead audio tech. "We will test each zone daily to be sure it is working and then perform the detailed tests on [every speaker in] selected zones so as to test every seat speaker every two weeks."

At first, the seat loudspeakers seemed like a gimmick to me. However, after understanding what Deans needed to accomplish in this huge, in-the-round facility, and hearing the result, I'm not sure it would have been possible any other way, and I've come to realize that they are critical to the success of the design.

Even without them, the speaker system for LOVE is massive. I've worked on some complex sound systems but, staring up at the ceiling of the LOVE Theatre at the roughly 300 conventional, mostly Meyer self-powered loudspeakers [see equipment list], I was baffled. When I ask Deans about the speaker layout and configuration, he simply laughs and says, "It's a little bit wacky up there." I'm not the only one who was confused-Deans and his team, in the early stages of the project, often had to carry around "very large" drawings to keep things straight. Even the legendary sound system alignment expert Bob McCarthy had to face this challenge. "Bob SIM'ed the system," explains Deans, referring to Meyer Sound's acoustic test and measurement system, "and he walked in, looked up, sat

down and said, 'So, what are we doing, Jonathan?'"

In addition to the performance audio system, the audio department is responsible for a number of other systems, including IFB (interrupted foldback-the earpieces TV newsreaders wear). This is something Cirque last did on KÀ and, on that show, the IFB allows the stage manager to talk directly to the performers onstage. "Currently," explains Pritchard, "the folks doing the bungie at the top of the show are on IFB to hear the calls from the riggers, who fly them. In addition, we will be adding several more for safety purposes." Pritchard's department is also responsible for another show system critical for LOVE: time code.

Time code (TC) plays a hugely important role in LOVE, and its use marks probably the most extensive use of show control on a Cirque project yet. "It's SMPTE, LTC 30 non-drop," explains Pritchard. "The TC is stripped on a track of the playback system, and distributed to sound [for the Meyer/LCS console], lighting, and projections. In addition to the various systems that read the TC, there are also TC displays in the stage management booth. Many of the cues that are called by stage management are called on the clock." Time code, of course, was designed for continuous, linear applications, so looping and linking segments of indeterminate length created a lot of challenges. "Time code is played from GigaStudio on its own MIDI channel," explains Whiteley. "If we repeat a section of music, we are basically going back in time, but Sinfonia will mute the time code-effectively 'freezing' it-then unmute it again when we return to the same place. TC will never go backwards, so none of the systems that respond to our time code will repeat a cue, or something worse."

As you may have guessed by now, this was a labor-intensive effort. "I'm the sound designer," says Deans, "but it takes so many people to make it work." He has high praise for his entire sound crew, as well as those who helped get the system in and the building built. "Paul Garrity and Matt Ezold at Auerbach Associates did a stunning job [as A/V theatre consultants]," he says. "I always try and have them on these kind of shows—I've done so many shows with them that they know me now." The audio system was supplied by Montreal-based Solotech. That company and project manager Bob Barbagallo, "were amazingreally excellent. Between Auerbach and Solotech, it was just incredible. It was a huge system and there was basically nothing wrong with it. When people make it work the first time, you save so much time, and that gives you time to mix and make it sound good rather than having to deal with other people's issues and problems, and things that they promised but couldn't deliver. Everyone delivered, it was fantastic."

It was apparently a good experience for the entire team, as well. "Jonathan is great," says Pritchard. "In my opinion, he is the only designer out there doing anything original. So many people would have a difficult time even knowing where to begin with a system as large as this. Having the opportunity to be this close to the music of The Beatles, and work with Sir George and Giles Martin—there is nothing about that experience that wasn't unique and legendary."

Lighting LOVE

LOVE marks lighting designer Yves Aucoin's first collaboration with Cirque, after many years working with fellow Quebec native Celine Dion. "I was pretty relaxed with my gig working here with Celine [in Las Vegas on *A New Day*]", says Aucoin. "They called me for this one and I couldn't believe it—I mean it's Cirque Du Soleil and The Beatles. You can't say no to that! It's one of those phone calls you get in your life and say to yourself, okay, let's do this one for real."

That phone call began a two-year process to bring the show to opening night, and Aucoin's lighting for the show is at times beautiful, at times ethereal, and at all times clean and effective. Aucoin was born in the '60s but, thanks to his older siblings, was aware of The Beatles at a very young age. He was, he says, "inspired really soon about the project. I often had a feeling about the songs listening to a CD in my car—I would get a color or an image from

"The 280 outputs from the console drive 6,341 loudspeakers. No, that's not a typo; *LOVE* has more than 6,000 loudspeakers."

the music," which might be translated into a scene of the show. "Dominic Champagne was the driving force; I try and take the poetry of Dominic and the vision of [theatre and set designer] Jean Rabasse and translate that into lighting."

Aucoin's lighting integrated tightly with the other show elements; this is critical because, with the 360° nature of *LOVE*, lighting and projections are the major driving visual force. "I have worked a lot with video," explains Aucoin, "and I work really hard to blend the image and the lighting together. [Projection designer] Francis [Laporte] is the same as me, and we became good friends working on this show. We start with fantasy and ideas and dreams, and we worked closely with the set designer to find one imagery."

Aucoin explained that his main challenge in the final weeks approaching the opening was to "take the 2000 people's eyes to the right place. At first, Dominic needs to see everything to stage it, and so we started wider. Now we are going narrower and narrower, and going from that verse to that chorus to that bridge and having the audience looking at the right place without knowing. On a normal proscenium stage, it's easy to do that, but in 360°, sometimes you have to balance the stage and bricks and confetti and the 40 people onstage and get the audience to focus on this one guy."

The lighting system

Aucoin is a very hands-on designer, to the point that he does the bulk of the programming (on an MA Lighting grandMA console) himself. As for fixtures, he says, "It's the first show in my life that I have just one brand of moving lights. Usually I mix and match but, when I put my dream list together, it was a question of noise. For a musical show, it was really important for Jonathan—and for me, too—that we keep the noise level as low as possible. Vari-Lite offered that and, after that, it was a question of washes and type of light. For me, Vari-Lite is sexier—the way they move."

Indeed, Aucoin's moving light rig includes 54 Vari*Lite VL3500Qs (that's Q for quiet), 64 VL3000Qs, 56 VL2500 Spots, and 30 VL3000Q Wash units. Also in the rig are 21 Martin Atomic 3000 strobes, just over 400 ETC Source Fours of varying types, 40 Altman Micro Strip MR 11s, eight Robert Juliat Ivanhoe followspots,16 WildFire LT40F and 12 WildFire fluorescent UV units.

A highlight in the technical integration for the lighting department is the number "Lucy in the Sky with Diamonds," which features a huge array of Color Kinetics LED strings, which envelop the audience in a three-dimensional diamond-sky world. "Dominic came up with some ideas, and the set designer came up with some pictures," says Aucoin, speaking about his Eureka moment, when he realized how to make the effect work. "One day, I was in the shower, and I realized that it's really the way you patch. I immediately got on AutoCAD–I was still wet—and I repatched all the lines."

"The LEDs used in 'Lucy' are Color Kinetics I-Flex," explains *LOVE*'s head of lighting, John Bartley. "The most interesting thing is how we integrated them—we had to figure out how to page string lights out into the theater. The riggers, headed by rigging project supervisor Stephan Wood and head of rigging Brett Barrett, came up with an ingenious, elaborate fly system. Throughout the grid, the strings all pulled back to a head block and arbor. We had custom tubes made to guide the light strings through the grid."

Lighting control data distribution for this sophisticated system was yet another challenge. The large lighting network, explains Bartley, "is broken up into five separate V-Lans [virtual networks]: ETCNet2 for DMX, grandMA with a ETCNet2 chip also for DMX, the AMX touch screen control system, the lobby control system, and the programming PC."

Even the fog effects on this show are sophisticated. According to Bartley, *LOVE* has "a 3,000-gallon liquid nitrogen tank with a vaporizer to run the fogger propellants, and a Vacuum Barrier Corporation vacuum-jacketed piping system which feeds the MDG low-fog units. This system prevents the pipe from condensating by having a doublejacketed pipe with a vacuum between them. The vacuum is maintained by a pump." Aucoin is a fan of the MDG foggers. "MDG is always part of a show for me," he says.

The lighting department's control over yet another system was critical for one amazing scene: "Within You, Without You" where (Spoiler alert: Skip the rest of the section if you want to be surprised in the theatre, as I was) a giant "bed sheet" is brought from the center of the stage to cover the entire audience. Later, the cloth is sucked away into a hole in the stage nearly as fast as it appeared; this is assisted by the lighting department's control over the building's air-handling systems.

"After three months," on A New Day, says Aucoin, "it was on my desk that Celine was not happy, because, for her voice, she is really specific about humidity and air flow. I said to myself, the next time I do a project I will have a little control [over the HVAC system] and, at the first meeting for LOVE, I said that [about HVAC] and now I'm stuck with it. I open my big mouth and sometimes I pay for it," he says with a laugh. "But it helps a lot," he adds, "because we have a lot of kabukis and other pieces, and we have cues where we ramp down the HVAC for a second or two, and, of course, we control the air flow for the big bed sheet." For control over the HVAC systems, Bartley explains, "We link to a system called 'Tridian' through a web browser, which lets us control all the air handlers, dampers, and exhaust fans in



the building. We can then pressurize the room as needed—we can effectively move air any direction in the building." *LOVE* also uses an extensive AMX touch screen system. "We use it," explains Bartley, "for Q-lights, house and lobby lights, stage theatrical work lights, and selected rehearsal lighting for the stage managers."

While the lighting department has the ability to trigger cues from the time-code feed to allow extremely tight cueing, precision-aligned with the soundtrack, the bulk of the show is manually performed by Aucoin's old friend Robert Brassard. "He's a really good, musical, board operator," says the designer. "He's a big Beatles fan and knows all the songs, so that's worked out great." The time code offers precision when needed, "because, in the introduction of 'Lucy' and at the end, there are all these sound effects and it's not countable. There are a couple of places where the soundtrack just starts, with no drummer counting in," so those cues, too, are taken from the time code.

The lighting team

Aucoin has high praise for his assistant, Karl Gaudreau, Bartley, and the entire team. "It was a great crew. From Day One, they were so together and just all with me; this crew was just excellent."

"This was the first time I have worked with Yves," adds Bartley. "He is a pleasure to work with. He knows what he is asking you to do and he helps a lot in the field. You do not have to redo things twice with Yves. He is very organized and he knows how to prioritize to make things flow smoothly."

"We had such a good, almost unexpected reaction from the audience," adds Aucoin." They seem to be touched emotionally and, for me, it's really, really important that we are reaching the audience. I feel so lucky to be part of this team. The times I was programming at night and [sound designer] Jonathan Deans and Giles Martin were mixing the songs in the theatre—I mean. there are thousands of people who would pay to be in my place to listen to that!"

Projections in 360°

On *LOVE*, lighting and projection work together to create a cohesive visual environment. "I've been very close to Yves in the way we design things," explains the French-Canadian projection designer Francis Laporte. He's another Cirque veteran, having designed the touring Varekai and Dralion. LOVE, explains Laporte, is "a 360° environment, which was a big challenge for us. We knew from the beginning that the video and lights would be very involved; the idea was to create an intimate environment where everyone feels that they are there with the presence of The Beatles-to not be a documentary. And that's why I created more evocative imagery-we had this idea that we were diving into the journey of the character of the song itself. I come from the theatre world, and these big screens could be very strong-or too strong for the show. I tried to not take over the focus of the show, just support what's going on onstage. Sometimes the images are a counterpoint; sometime they emphasize some mood of the song."

Laporte also began his creative process for LOVE with a trip to England. "We traveled to the Abbey Road building where The Beatles did their last performance for Let it Be," he says. "It became clear for us that the first image we had to create was as if we were at the top of the rooftop around this Abbey Road building. The screen in my mind was more a panoramic landscape surrounding us and the building, [as opposed to] a movie screen." Thus the theatre features an environment built around two enormous 100 x 20' screens on the front and back walls, and a number of other screens-some translucent, some opaque-which come in and out to break the space into half or quarters.

Creating content

Laporte created most of the imagery himself, working with a very small team. "That's my favorite part, when I'm doing the shooting," he says. "I did some sketches for the whole show, and my vision was pretty much clear, so I didn't need a lot of experimentation." There were a couple of larger-scale shoots and, he says, in certain cases, "for example, when I shot the yellow rain boots for 'Lady Madonna,' hired a director of photography. But most of the content has been done with a very small team and I was always there to shoot."

Laporte often described the LOVE imagery as "hand-crafted," and while that may not be obvious by viewing the polished end product, it certainly does describe his creative method. "Most of the content was made in a fish tank with water, cream, oil, watercolors things like that," he says. "I got a camera where I was able to shoot 400 frames per second. That gave me the opportunity to have very slow motion, where an event of one or two seconds became one minute."

With the raw imagery created, Laporte moved onto the compositing, editing, and processing phase, again working with a small team. "Most of the content was created in [Adobe] After Effects from 2D pictures that I put in a 3D environment. I like the intimacy of having a few graphic designers who are very involved for the whole process, and can follow me if there are changes. The new generation [of designers] was not used to doing the traditional shooting like I do, so it was funny. At first, they were always doing too much cutting. I was like, 'I don't need to take over the focus in the first few seconds'. The image is clear and we were going for three minutes or four. I knew that, to not to distract the audience, I had to be very slow and not have too many cuts."

Laporte's style combines state-ofthe-art technology with tried-and-true techniques. "It became very clear that the show would probably run for a long time and, if I was using the very fashionable plug-ins used on ads and high-tech movies, in a few years, the show would look very dated. I had in mind always that it needs to be timeless—as timeless as possible."

The projection system

The immense amount of technology employed by Laporte and his team, realized each night by head of projection Jon Stolzberg, used grandMA consoles to control 20 Green Hippo Hippotizer-HD servers (distributed in the US by TMB), which output video through 28 different Digital Projection Inc. projectors. "I think I'm safe in claiming," says Stolzberg, "that this is the most complex, permanently installed video system ever put into a theatre." This is one reason that projection constitutes a completely separate technical department on this show. "I had to design a complex system that would function flawlessly within a complex environment," explains Stolzberg, "and I had to be able to explain every element of it to get the approval of the creative staff and the producers. I think Cirque du Soleil has set a new standard for projections with this show, and they really put a serious commitment of funds and personnel behind it."

The Hippotizer video servers offered LaPorte flexibility that he had previously only dreamed of. "Usually," he says, "you are going back to the studio and doing a new render, and you are not there [in tech] when the things are going on. Things can evolve pretty quickly, and for this show, I was as quick as Yves [Aucoin] for the first time—I was able to manipulate eight layers of HD in real time. It was a great fortune to have this opportunity to follow for the first time the rhythm of everyone. I don't think I can do a show without this anymore."

Control for the enormous system was yet another challenge for the team. "We have 20 media servers synchronized together—and that's a big DMX universe," says Laporte. "For this show, we were customizing most of the systems, and it was a little scary at the beginning, because there was no other example to tell us how to put things together."

"Each Hippo," elaborates Stolzberg, "requires over 500 channels of DMX, and is driven by MIDI time code. Our grandMA lighting board is networked to six grandMA NSP units—giving us 24 DMX universes to deal with. ETCNet2 is used to deliver DMX to the Hippotizers—I believe this may be



the first major instance of this protocol being used to connect two pieces of equipment that are not ETC units. Other protocols were considered, but ETCNet2 was the only EDMX protocol available at the time that would give us the data throughput that we needed. We also use ETCNet2 to deliver DMX codes to the v-Base units [about which more below]".

Video is transmitted in DVI format to the 28 projectors on the show. "We have a completely digital signal path," says Stolzberg. "The Hippos output two channels of DVI each. After these signals run through the DVI matrix switching network, they are converted to optical signals, which run on fiber from the booth up to the projection catwalks. At each projector, the optical signal is converted back to DVI. All of our keystone correction is done electronically on the server side on the Hippotizers-they have 'infinite' keystone capability. Some of our keystones are so extreme that they are beyond the optical capabilities of the projectors, anyway. All of our edgeblending is done on the Hippo servers as well. The wide-screen images (approximately 100 x 20') are built from five

Above: "Because" is one of many numbers that features flying performers.

stacks of two projectors each. This requires very subtle edge-blending to make the panoramic images flawless, and the Hippos made it easy. Doing it on the projectors would have taken a lot more time. Also, to compensate for the difference in 'black' between overlapped and non-overlapped areas, we used a black-level compensation feature of the Hippo software."

In addition to static projectors located throughout the venue, Laporte uses four v-Base moving yoke units for projectors, made by the Danish company Brother, Brother and Sons (now handled in the US by A.C. T Lighting). With them, "I'm able to project wherever I want," says Laporte. "I like this device-this one I've been waiting for a while. I can project on the floor, or on the artist, or on the set, and it gives me a lot of freedom. It has become clear in my mind that light and video are getting to a point where they have become more and more merged together and, with these units, we are seeing light and video in the same way. To me, video is light. Now I was able to move my projector, like Yves was

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able to do with his Vari-Lites. I think we are going to see these v-Bases much more, and I think it will change the way people have in mind the video."

"We have four of the v-Bases installed in the theatre with DPI 12000Dsx projectors," explains Stolzberg. "They have performed well and they give us a lot of flexibility. We have complete control over zoom and focus as well as the vertical and horizontal rotation of the entire projector. Combined with the extreme keystoning capabilities of the Hippotizers, we can place video on hanging screens at very sharp angles so that the images appear to have no visible light source. The v-Base projectors are also used several times to augment lighting effects with ambient video moving over scrims and other scenic elements."

Time code and show control for projections

The projection system relies heavily on time code. "The grandMA is driven by SMPTE time code, delivered to us by the audio department," says Stolzberg. "This keeps us in perfect sync with the music. The overall system, however, is a SMPTE/MIDI hybrid: The SMPTE feed comes into a time code distribution amp. It is simultaneously sent to the grandMA consoles and to a SMPTE-to-MIDI time code converter. The MIDI output goes to a MIDI distribution amp, and then into all the individual Hippos."

The transitions between songs provided yet another technical challenge to the projection team. "It was a little scary at the beginning," says Laporte, "because I knew if they would be lifting the time code during a lull or technical problem or whatever, I would need to follow them."

"Since there is always the possibility that we will be required to go off time code altogether and go to manual cueing for one reason or another," says Stolzberg, "we have that capability built into the grandMA programming. Our operators have a lot of both flexibility and control."



In addition, explains Stolzberg, "We get a series of data feeds from the automation department, and this data is used to synchronize the reveal of projected images with the raising and lowering of the large curtains that cover the panoramic screens." Stolzberg explains that he is also using Stardraw control software "for most of our 'housekeeping' functions, including remote control of the shutters on all the projectors and remote control of our DVI switchers. Eventually, we will develop additional functions that will include the ability to monitor various pieces of equipment and automatically alert us in the event of a potential or actual failure."

Laporte was very happy with his team for this show, and the feeling was apparently mutual. "I think Francis did a fantastic job," says Stolzberg. "When you think about the amount of imagery he had to create to fill 20 media servers over 90 minutes, it's like producing a feature film. It was a pleasure to work with him, as well as with Philippe Gendreau, his assistant, and Luc Lavergne, who was responsible for the extremely complicated 3-D programming, graphics production, rendering, processing, and file distribution that transformed the raw materials into

Above: "Gnik Nus/Something," which shows the use of the production's abundant number of projection screens.

files on the servers. It is my first show with Cirque, and I feel fortunate to see how this unique organization manages to achieve the impossible. I also feel very fortunate to have had the opportunity to work on a project where the producers' commitment to video in the show was backed up by a budget that allowed us to do it right. Ultimately, the process has been both a challenge and a satisfying achievement." Laporte adds, "It's been a great fortune and a great experience to do this show."

With LOVE, Cirque du Soleil has again raised the bar for the sophisticated use of design and entertainment technology to communicate emotion and story. The technology is less overt than in *KÀ*, but it easily communicates the brilliant vision of its creators.

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LOVE

Guide, Show Concept Creator, Director: Guv Laliberté. Writer, Show Concept: Dominic Champagne. **Director of Creation, Show** Concept: Gilles Ste-Croix . Associate Director of Creation: Chantal Tremblay. Theatre and Set Designer: Jean Rabasse. **Costume Designer:** Philippe Guillotel. Sound Designer: Jonathan Deans. Lighting Designer: Yves Aucoin. Video Projection Designer: Francis Laporte. Choreographers: Hansel Cereza, Dave St-Pierre. Acrobatic and Rigging Designer: Guy St-Amour. Acrobatic Performance Designer: Daniel Cola. Make-up Designer: Nathalie Gagné. Props Designer: Patricia Ruel. **Puppet Designer:** Michael Curry. Aerial Acrobatic Designer: André Simard. Dramaturge Consultant: Alexis Martin. **Comic Audio-clips Designer:** François Pérusse . **Music Director:** Sir George Martin . Music Director: Giles Martin. **Executive Producer:** Neil Aspinall. **Theatre Consultant:** Auerbach Pollock Friedlander. **SVC Consultant:** Auerbach Pollock Friedlander. **Architect and Construction** Management: Marnell Corrao Associates. Mechanical/Electrical: Bennet and Jimenz . Structural: JBA Consulting Engineers. Acoustician: JaffeHolden. Automation Controls, Winches, Tracks and Trolleys: Stage Technologies, Inc. Lifts: Show Canada. **Counterweight Rigging and** Stage Lift Installation: Pook Diemont & Ohl.

Slipstages/Sloats, Sloat Lifts, and Traps: Conception D. Bédard. SVC: Solotech. SOUND: Main Arrays and Overhead: Meyer Sound M1-D, M2-D,

CQ-1, CQ-2. Subwoofers: Meyer Sound PSW-2, USW-1P, Danley Sound

TH-1151. Surround: Meyer Sound M1-D, Innovox custom fabricated units.

Stage edge: Mever M1-D. Portable: Meyer UPA-1.

Power amplifiers: Crown CTS2000, CTS3000, CTS4200,

CTS8200. Monitoring: Meyer Sound RMS

with iLon Ethernet adapters.

Power distribution, rigging and installation components: Solotech.

Equipment Racks and

Accessories: Middle Atlantic FOH Console: Level Control Systems Console with VRAS (Variable Room Acoustics)

Playback System:

(2) Rain Recording Custom Element 64. Tascam GigaStudio 3. Realtime Music Solutions

- Sinfonia. (2) RME ADI-642 MADI-to-ADAT optical converter. (4) Apogee DA-16x digital-to-
- analog converter.
- (1) Apogee Big Ben master word clock.

Miscellaneous:

- (6) Waves Maxxbass processor. (18) Lectrosonic VRT
- trans/receiver. (1) Yamaha PM5D console.

PROJECTION: (24) Digital Projection Highlite

12000Dsx projector. (4) Digital Projection Lightning 30sx+ projector. (20) Green Hippo Hippotizer-HD media server. (1) grandMA Light.

- (4) Brother, Brother & Songs v-Base moving projector yoke.
- (3) Dtrovision 18 x 18 DVI matrix switch. Stardraw remote control

software.

LIGHTING:

Automated Units:

(54) Vari*Lite VL3500Q. (64) Vari_Lite VL3500S Spot. (56) Vari*Lite VL2500 Spots. (40) Vari*Lite VL3000Q Wash. (21) Martin Atomic 3000.

Conventional Units:

- (24) ETC Source Four 5°. (48) ETC Source Four 10°.
- (200) ETC Source Four 19°.
- (125) ETC Source Four 26°.
- ETC Source Four PAR.
- Altman Micro Strip.
- Robert Juliat Ivanhoe (8)
- Wildfire WF-LT40S. (16) Eclipse 2.
- Wildfire Fluorescent DMX.

LED Units:

- (130) Color Kinetics ColorBlast6.
- (5) City Theatrical PDS 750TR.
- (5) City Theatrical PDS 375TR.
- (12) Color Kinetics iW Blast 12.
- Color Kinetics iW PDS-150 DMX.
- (20) Color Kinetics iW Profile.

Atmospherics:

- (6) MDG Atmosphere.
- MDG Low Fog Q.
- (6) MDG Max 5000. (8) MDG Max 3000.
- (2) MDG Mini Max.

Lighting Control:

- (2) MA Lighting grandMA.
- (1) grandMA Light.
- grandMA PC. (9) MA Lighting NSP.

Production Video System: Panasonic AS-E560 cameras

with pan, tilt, zoom control, and AW-RP501 controllers.

Panasonic AW-E600 & WV-CP470 fixed cameras.

Panasonic WV-BP330 monochrome cameras (IR).

Cantronic Systems CSI-IR 100m60 IR illuminators.

Leitch video distribution amps.

Blonder-Tongue modulators, amps, combiners, and taps. Rane audio distribution amps. Bittree patching panels.

Assistive Listening System for the Hearing Impaired:

Listen Technologies LT-800-216 wide-band wireless FM assistive listening system with antenna and receivers.

Production Intercom and Backstage Paging Headend System:

Clear-Com Matrix Plus 3. Compact72 digital mainframe. Clear-Com I-stations, I-1210, I-1370, I-1470.

Clear-Com RCS-2000 eightchannel analog switching matrix.

PS-464 four-channel power supply.

Clear-Com RS-501, RS-522 beltpacks, KB-211 loudspeaker stations.

Sennheiser HMD-410 headsets.

Telex BTR-800 wireless base stations and TR-800 belt packs.

Program Monitor/Page System:

Peavey Mediamatrix X-Frame. QSC CX-204V power amplifiers.

EV 409-8T and EAW SMS3 loudspeakers.

Ethernet Audio Network:

Linksys workgroup switches and 801.11G access point.

D-Link Ethernet 2witches with SC fiber ports.

Fiber-optic interfaces and panels by Hubbell and Black Box.

Portable Equipment:

Microphones by Shure, Sennheiser, and others.

Whirlwind stage boxes.

Yamaha and Mackie submixers Stands by AKG.

Portable monitor s by Anchor.

MIDI distribution by JL Cooper.