Inspired by the hugely popular BBC television series *Walking with Dinosaurs*, this unique Australian production features 15 life-size dinosaurs brought to life by cutting-edge animatronics and human operators. The $10-million stage adaptation was described by one of its producers, Malcolm Cooke, as a “new genre” of entertainment. “There has never been a show like this before,” he said. “It’s taking a documentary about natural history and turning it into an evening’s entertainment.”
Walking with Dinosaurs was watched by 470 million people worldwide, so it’s understandable that the live show has proved a big hit with audiences. After playing for ten sold-out weeks in five cities in Australia, where it was seen by an audience of over 300,000, the show has come to North America for a two-year arena tour.

Breaking a 65-million year absence from the stage, the 15 dinosaurs, including the Tyrannosaurus Rex and an 85'-long, 37'-high Brachiosaurus that towers over the audience, made their world premiere at Sydney’s Acer Arena earlier this year.

Up to 19 puppeteers move the massive frames of the giant creatures that move, breathe, snort, groan, and grunt their way through an 80-minute show. The dinosaurs, which were designed and built by Sonny Tilders, were constructed at Melbourne Central City Studios in the Docklands, and were made by the same animatronics team who worked on the film, Star Wars III: Revenge of the Sith, which was shot in Sydney. The team has spent a year building, perfecting, and playing with the giant lifelike mechanical beasts.

“Many of the technologies we are using on Walking with Dinosaurs are borrowed from film,” says Tilders. “The computer software and hardware we have developed is based on the systems used to control animatronic creatures in feature films. To make it appear that these creatures are flesh and blood, weighing six, eight, or even 20 tons, we use a system called ‘muscle bags,’ made from stretch mesh fabric and filled with polystyrene balls, stretched across moving points on the body. These contract and stretch in the same manner that muscle, fat, and skin does on real creatures.”

Creating the fearsome Torosaurus took 971' of fabric, 433' of foam, 54 gallons of paint, 24 microprocessors, 15 hydraulic rams, and six motors. It reportedly weighs as much as a family car. Two remote controllers and a driver operate each beast. “The puppeteers use ‘voodoo rigs’ to make many of the dinosaurs move,” says Tilders. “They are miniature versions of the dinosaurs, with the same joints and range of movement as their life-sized counterparts. The puppeteer manipulates the voodoo rig and these actions are interpreted by computer and transmitted by radio waves to make the hydraulic cylinders in the actual dinosaur replicate the action, with a driven hidden below the animal, helping to maneuver it around the arena.” Five
frisky 10’ raptors are operated from the inside by puppeteers.

Directed by Scott Faris, the action spans 160 million years, and is narrated by actor Bruce Spence, who plays Huxley, the paleontologist. He tells the story of the dinosaurs’ lives. Each dinosaur has a character; one even walks with a limp—the result of a bad encounter with an unfriendly fellow reptile. The show is a mixture of natural history and spectacular action, as dinosaurs fight it out like the best pro wrestlers.

**Environments of light**

John Rayment, the Australian lighting designer for the Sydney Olympics Opening Ceremony, as well as Hong Kong’s Symphony of Light sky show, was contracted to design the lighting for the production. He describes the show as being not so much about the individual performances, but the illusion collectively created by the design team. Lighting is particularly important for this production, because, no matter how brilliant the creatures are, they have to be presented in an environment that is theatrically credible.

The design remit was to create environments for the dinosaurs to move in and to produce various large-scale effects sequences through the show, such as traveling through time and space, firestorms, rain deluges, and the end-of-the-world comet strike.

Not only did Rayment have to contend with lighting large arena floors, he also had to take into account the space above, as several of the creatures are incredibly tall. “It’s important that people realize, from the moment that they enter the arena, that it’s not a regular show, especially as there’s no word of mouth yet, due to it being a world premiere,” he said early on in the show’s Australian run. “It had to be special, with a sense of adventure; it’s a big show and it had to feel big upon entering the venue. Consequently, the rig had to be considered for its cosmetic values before it even did anything.”

“We were dealing with a raft of unknowns, on a practical level and an artistic level,” added Jason Morphett, associate lighting designer. “We had to come up with a concept that was versatile enough to cope with the various spaces the show would play in, as well as the belief that the rig should be visually unique, helping to transport the audience from the moment they entered the space.

“From a design point of view, we had to contend with lighting a cube of space 130’ long by 115’ wide by 45’ high. The Brachiosaurus heads are between 26’ and 39’ high and free-roaming, so we had an enormous volume to light. We also had audience on three sides, so we needed to be able to shoot forward, backwards, and to both sides from all positions over the main arena.”

Rayment and Morphett experimented with various shapes and layouts of a conventional nature until the former came up with the light pod, which gave the duo the versatility needed to go from venue to venue. “We could expand and contract the...
rig exponentially from a nominal center point, and also contour the individual heights to suit the shape of the various roofs and sightlines,” said Morphett. “It also gave the rig a very different look.”

“At one point, I was toying with having just one giant pod that would track around the room,” said Rayment. “But we didn’t have the resources or the time. Having a number of pods with several levels of fixtures allows layering of patterns, colors, and angles; painting with textures on the floor and, very importantly, in the air! I’m not trying to create a forest, rather a stylization of a forest.”

The pre-production period in Sydney was held in a makeshift WYSIWYG studio, while the show was effectively being workshopped at the Showground in Melbourne. Other than odd trips down to see what was happening, Rayment and Morphett were reliant on videos being sent to them by courier, as well as copies of the projected images sent to them as fast as set/projection designer Peter England finished. Also trickling in was the music score by James Brett.

After a week of throwing ideas around, they brought in Jason Fripp as the main programmer, using an MA Lighting grandMA console. “WYSIWYG allowed us to learn a lot about our rig; unfortunately, most of the time we were lighting an empty space!” added Fripp. “A fabulous score was being produced in one place, we were producing fabulous lighting in another place, and, meanwhile, in Melbourne, people were building the creatures. Not quite a traditional schedule, but nevertheless, there’s a show.”

When it came to choosing light fixtures, the designers did not have the luxury of being able to specify exactly what they wished for. Putting together a show of this size in Australia, particularly in the busy summer months, means that you really have to ask what’s available first. In Australia, there were 18 pods, sub-hung from five 131’ mother trusses, which had three rigging levels and held five Martin MAC 2000 profiles, four Vari*Lite VL3000s, two High End Systems Cyberlight Turbos, and a Martin Atomic strobe. The three horizontal side trusses had 13 Mac 2000 Profiles, nine Mac 2000 Performance units, and an Atomic 3000 strobe. The vertical trusses on either side of the projection screen held four VL3000 Spots and two Mac 2000 Performance units.

“The VL3000 has a lovely light output and is flexible, reliable, and consistent,” said Rayment. “I chose the Mac 2000s because they’re such good workhorses, and you get more of them for your money these days. I also definitely wanted a moving mirror; people tend to forget they’re quite a useful fixture, and the Turbo is punchy. The Mac 2000 Performances were chosen because I needed shutters for the scenic elements around the projection screen.”

Regarding the show’s projection scheme, background imagery is delivered to a 33’ x 53.5’ automated iris screen via a system comprised of three Christie S+20K Roadster projectors, driven by a Wings Platinum computer system from AV Stumpfl, which is controlled by video crew personnel. (According to chief engineer Eric Lee, Wings Platinum is similar to other wide-screen presentation systems, such as Dataton’s Watchout.) The program allows for keystone correction of the projected image, as well as blending the three projectors to form a single high-resolution picture. The total resolution of the projected imagery is 3,200 x 2,044 pixels.

In addition, there’s an IMAG system to display live video of the dinosaurs, as well as Huxley, the narrator. This system uses three Ikegami HK-366 cameras, with two 55x lenses and one 70x lens. Switching is handled by a Grass Valley 110 switcher. IMAG is seen on 20’ x 15’ front-projection screens that are portrait-orientated with Barco ELM Director 18 projectors. The video gear was supplied in the U.S. by Screenworks NEP. Lindsey Haney is video director. David Moss is the projectionist.

Ken Roach, the production electrician, worked closely with Bytecraft
Entertainment, who supplied the lighting for the entire tour, to manufacture the pod structures and prep the huge kit list. The task of moving this large and complicated rig between venues fell to Roach, with as little as three days between load-outs and opening nights. He came up with custom-built, wheeled cradles for the pods to travel in, which meant that only the bottom Mac, the Cybers, and one VL had to come off each pod for transit.

Rayment only had one custom gobo made—the dinosaur footprint—with the rest sourced straight out of the catalogs. “Unless you need something very specific, such as a fossilized footprint, I’m of the view that if you can’t find patterns to represent the job, it’s a bit silly,” he commented. “I was going to use glass gobos so I could do more things like morphing, but they ended up being unjustifiably expensive; as it was, we spent $40,000 on standard metal gobos alone.” The only conventional lamps on the rig were 19 ETC Source Four Profiles, which highlight the massive dinosaur teeth that frame the projection screen.

The smoke effects were provided by four Look Solutions Unique hazers, four of the same company’s Viper Smoke Guns, and four Le Maitre LDG Low Smoke Generators.

The U.S. rig, supplied by Upstaging, has not changed much, except that there are only 16 pods, and 16 Source Fours have been replaced by 12 Vari*Lite VL1000 AS units fitted with catalog gobos. These are mounted on new transverse truss placed immediately downstage of the U.S. video projector truss. Also added are two Hungaro Quasar 15K strobes and a Hungaro 45K RGB strobe, in addition to the existing Atomic strobes on every pod. Four followspots—Lycian Medium Throws with Lee 204 correction—are now rigged as underslung truss-mounts on audience trusses.

For the U.S. tour, Tomcat worked with Upstaging and the firm Fader Higher, run by production manager Jake Berry, to create the pods. Each pod is secured to a cross of truss on top of a tower. The cross consists of a “spine” truss (about 9’ 6” in length) plus two smaller trusses that attach to the spine’s center (the total span is 9’ 6” as well). Each of these crosses are supported by a vertical truss that attaches to the underside of the spine truss, resulting in a total assembly that is 81.5” tall. The lighting pods are rigged to each end of the upper cross. (Also for the U.S. tour, Berry notes that Tait Towers supplied a custom floor, 220 x 85’ in size, plus custom side panels for the edge of the playing surface, as well as all draping and masking.)

For transportation, a custom dolly was designed that, when loaded, has two completed pods stacked on it. The dolly separates in the center so that the pod can be partially assembled on the dolly and rolled around until needed during loading. All the pods have been powder-coated in black.

Each of the set elements have six Color Kinetics ColorBlaze LED fixtures built into them, running from a battery pack and inverter system with a PC to give local control. At the production desk, the main console was networked to two PCs running grandMA on PC, so Rayment and Morphett could select what they looked at on their screens. The main PC, on which WYSIWYG was running, was also networked, allowing them to check back to what they had visualized in the pre-production and compare it to what they were doing in the arena.

“This has been a brave, wonderful adventure to get a decent spectacle on the road,” Rayment concluded. “Because it was a design-led production on all levels from the outset, with no individual stars and no previous productions for comparison, there was a tremendous collaborative atmosphere. We’re all very proud. Of course, Baby Brachiosaurus is looking for an agent now…”

**Distributed dinosaur sound**

Peter Hylenski was appointed sound designer for the U.S. tour, with Clair Brothers supplying the rig. With a
tricks we use throughout the evening to help the audience perceive a more realistic, lifelike quality to the dinosaurs as well as the music.” One of these is the use of Meyer Sound’s LCS Series LX-300, whose main job is spatial placement of effects and tracking of dinosaur sounds. The product’s “space map” feature allows him to create a “map” showing the various loudspeaker zones, into which he can pan a sound associated with each dinosaur’s movement onstage.

“When a dinosaur walks onstage through a particular loudspeaker zone, we can source its appropriate sound to it,” Hylenski said. “Each dinosaur also has an onboard sound system. They actually have speakers built into them; we’re broadcasting the dinosaur’s ‘voice’ from the sample playback to source within each character. From there, we’re delaying the entire PA back to that single point source and, as the dinosaurs are moving, we’re adjusting the attenuation between each loudspeaker and that dinosaur. So, as the dinosaur steps into the arena, the Space Map is tracking him as he moves around.”

A Stage Research SFX playback system is used, allowing Hylenski to transfer all of the sound effects in multi-track format, coming out of a ProTools editing system, and mix them live in the room through LCS. This provides spatial sound effects to the overhead, array, and proscenium loudspeakers—giving separate elements of the effects their own unique placement in the arena.

“As in Australia, data is broadcast from the dinosaurs to the SFX and Tascam GigaStudio sampler systems. The small dinosaurs have transmitters within them, so the performers activating these creatures can trigger sounds to coincide with the movements of their mouths. This is then broadcast back to small speakers in their mouths.

“Essentially, we have a couple of parallel playback systems running concurrently: SFX, which does all of the music playback for the show as well as the multi-channel sound effects, with the occasional dinosaur effect,” explained Hylenski. “Then we have a GigaStudio sampler set up, which plays all of the large dinosaurs’ sound effects in real time from the puppeteers controlling them. Everything passes through the LCS and Yamaha console and exits through a series of Dolby Lake LP4D12 Digital Processors into the speaker rig.” The wireless and communication systems are by Wireless First.

At the moment, the dates for Walking with Dinosaurs are announced through January 13, but there are plans to stay on the road for months to come, bringing the Jurassic era to an arena near you.