ARCHI·TECH

LAKE OF DREAMS, WYNN LAS VEGAS

Invisible
INGENUITY

For the star attraction of Wynn Las Vegas, it's what visitors *don't* see that makes their experience so incredible.

Las Vegas stands for many things, but more than anything it's the superlatives: the biggest, the best, the most. No surprise, then, that many advances in architectural technology, from fire safety to HVAC to theatrical lighting, originate in the name of show-stopping spectacles created for this desert city.

Though often developed for a specific debut, many of those advances travel well – and scale down, too – making Vegas a big influence on entertainment venues the world over. A recent example sets the bar high for architectural and technological integration: the award-winning "Lake of Dreams," part of Steve Wynn's $2.7 billion megaresort, Wynn Las Vegas. It deserves many superlatives, though its originality is truly independent of size.

So what if an 875-horsepower motor drives its hydraulic lifts? More important is its groundbreaking video, which projects crisply and tightly onto a waterfall, a large disk, and a 24-foot-high moving cutout shaped like a human head. So what if the spectacle takes place on a 3-acre lake that completely fills with bubbles in 15 seconds? More important is the audiovisual network running on a state-of-the-art video card through a general-purpose PC – something experts contended wasn't feasible. And, really, so what if the 38-foot-high robotic puppets dance to the music? More important, a Medialon control system and triple-redundant audio cabling ensure that show-goers in five listening zones hear every note.

The design team took pains to conceal such innovations within intricate architectural illusions. "That's what the owner was pushing for: that guests would enjoy the experience without seeing the video or sound technology," says Philip DiPaula, senior design engineer with SPL Integrated Solutions, Orlando, FL. "The whole goal was to make it as transparent as possible."

In fact, while most developers position their biggest attraction facing the Strip to lure crowds, owner and executive

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producer Steve Wynn chose to hide the lake environment behind a 140-foot-tall, tree-covered "mountain" rather than expose it to such brightly illuminated bustle. "The strip, although very interesting to most visitors, was not the mood and environment we were seeking," says DeRuyter O. Butler, executive vice president, architecture, of Wynn Design & Development. "The glaring signage and media boards of the Aladdin, the honking horns and the traffic jams were uncharacteristic to the lake in its calm mode and distracting to the fountain performance."

Wyatt DeFreitas, formerly technical director for Wynn Design & Development, adds, "You can't tell your neighbors what to do, and we wanted to control the design experience. That's one reason for the mountain." The layout also allowed the designers to situate a bar, a nightclub, shops, and five restaurants into the tree-

studded mound, right on the faux lakefront.

So while the resort's elegant interiors feature art nouveau and Asian motifs rendered in mosaic tile and silk-cushioned walls, the outdoor scene tends toward the surreal. A 90-foot waterfall and mist-breathing dragon statues cool the air and add a pleasant background patter. The trees are real, rescued from a golf course formerly on the site. "It's very dramatic, with wonderful, one-of-a-kind guest experiences," says DeFreitas.

Otherworldly Multimedia Spectacle

But it's at night that Lake of Dreams comes alive, thanks to an otherworldly multimedia spectacle. Four short, preprogrammed shows combine music, psychedelic lighting effects, and video projection onto the landscape. Colors and moving images enliven the effervescent pool, waterfall, and mist-shrouded stage elements.

"We went on to develop the mountain with an internal network of chambers that serve as a stage lift to display theatrical props, access points to various places in the landscaping to introduce other lighting effects, a waterfall that serves as a projection screen for imagery that interacts with the audio, and a lift position in the lake itself to introduce other theatrical effects," Butler explains. "All in all, as a stage set, the mountain also has the built-in flexibility to change and become other thematic scenes."

The attraction debuted many firsts, including a novel projection system and a PC-based control concept integrated through Medialon software. "Those were brand new – nobody had played with them yet," says Rod Hickey, president of specification and project-management concern Big Show Construction. "We got test units of the XLM-25 Barco projector fresh out of the factory. And the PC-based show control system was conceived for equipment that manufacturers like Apple said was coming. The video card wasn't quite out yet, so we were waiting in line with all the high-end gamers."

He admits, "It's kind of a crapshoot on the bleeding edge of technology."

Roll the dice: The team settled on Medialon, a control protocol created for high-end entertainment such as Broadway shows and multimedia museums. "It's powerful and requires some customization," says Josh Weisberg, president of live-event specialist Scharff Weisberg. "It works well for high-end, time-line-based application," a useful attribute in synchronizing multiple video images to specific frames.

Medialon also effectively automates the daily performances. "Theoretically the whole show can be run by one or two people," says DeFreitas.

Supporting Technology

In terms of architectural integration, the sound system is invisible yet ingenious. Speakers are hidden in balconies and patios, recessed into façade panels, and even housed inside what appears to be a lamppost. CAD drawings were used to model surfaces and predict sound transmission and the general acoustical properties of the loudspeaker system. "A custom speaker

Faces rise from the lake at various times during the display, appearing to react at what's happening on the screen.

was actually developed for Lake of Dreams, too: an asymmetrical, three-sided horn that worked with the diamond-shaped custom box on a pole that makes it look like a street lantern," notes Ed Sullivan, systems specialist with SPL.

To get the best sound from speakers behind grilles, the consultants measured horn locations, recess depths, and the ratio of open area to metal covering. Even the waterfall crash was engineered, adds Ryan Knox of Acoustic Dimensions, which did the acoustic modeling. The result: clarity and depth for the sound system, without bleed between locations.

Beyond high-tech gadgetry, Lake of Dreams called for brute force. Collaboration with building designers was vital to making sure the base building could support its unusual loads. "We had to tell the building engineers how much machinery was needed to do certain things: how fast it would move, how much it would carry," says Hickey. "The main stage lift was huge, larger than anything we'd played with before. It was nuts. The structural engineer kept asking us, 'What are you doing to my building?!'"

The mountain was a feat of its own. "Construction of the mountain was also a great challenge and required specialty consultants to engineer the structure that is contained within and to support the trees and all of the infrastructure," says Butler. "The structure is largely made of engineered and compacted earth, contained within mesh layers, likened to giant sand bags, piled up to form the mass of the structure and support the very heavy, up to 60-foot-tall trees planted on top. Virtually all of the landscape material is natural and planted and therefore must be irrigated, drained, fertilized, and inspected."

Holding the experience together, says DiPaula, is more than cement. Ethernet-based "handshaking" connects the disparate playback devices, as well as controllers on the hydraulics, air compressors, and 700 removable panels of underwater LEDs. "They all have to synch and acknowledge control of the others, so that when they press the start button, everything works," DiPaula explains.

A Balancing Act

In the end, the integration of architecture and experience – and the more literal integration of the various technology platforms – make the resort's feature presentation a winner. "We had to integrate Lake of Dreams with the base building construction: the façades, the conduit, everything,"

Puppets that are featured in the performance are attached to industrial robots (commonly used in car manufacturing plants) and then raised into position by a lift.

QUOTES FROM JUDGES

"This was the hands-down winner. I didn't think anything else came even close."

"That's exactly what it was, just awesome, heads coming out of nowhere."

"Words can't describe how awesome this installation is and how well it blends in with the architecture. I don't know who designed this, but they were incredibly creative."
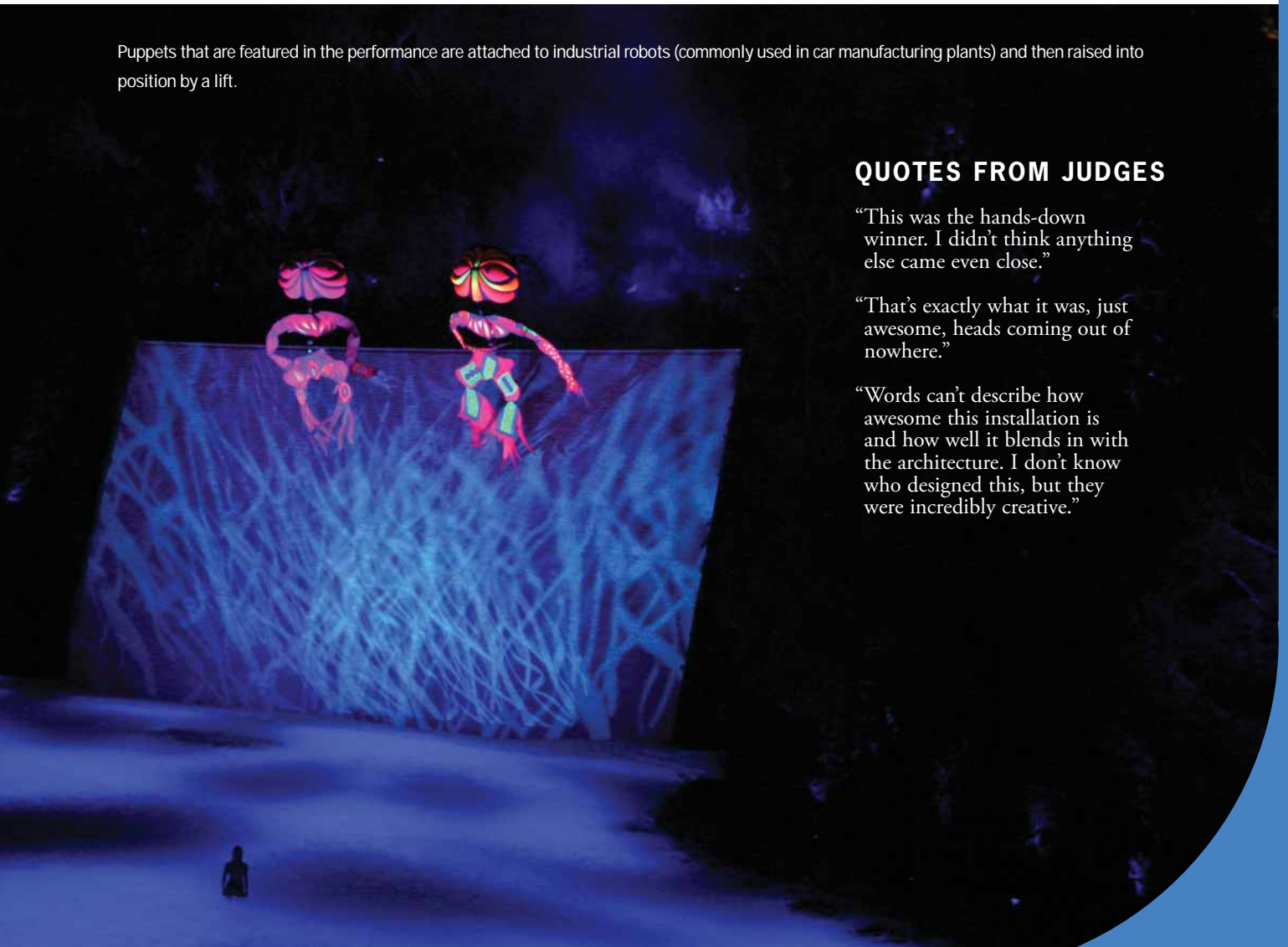
With style and rhythm, the visual dances to the audio at Lake of Dreams.

says DiPaula. But the team's eyes were not permanently fixed on the show. The performance specialists spent much of their time focusing on guest comfort and venue aesthetics, in concert with the in-house architect Butler/Ashworth. "There were a lot of sightline studies, and we paid a great deal of attention to plantings," says DeFreitas. "And we did mock-ups for years in the United States and Germany to perfect the waterfall."

Much collaborative time was spent taming cost and schedule, says DiPaula. "The general contractor was responsible for the building and for Lake of Dreams, so they had a big balancing act," he says. Based on newspaper reports, balance was hard to achieve. The original price tag for the resort was $1.63 billion, later revised to $1.81 billion, then $2.4 billion, and finally topping out at about $2.7 big ones.

"The building was always ahead of us [in terms of planning]," says Hickey. "Shows are sort of amorphous. We often didn't know what the show would exactly entail. But we had to define what it was before they poured the concrete and put in the steel." Even the final scheme for networking and automating the show wasn't clear until days before the Wynn Las Vegas ribbon cutting. "It's impossible for the client to know exactly what they need until you're in rehearsals," Sullivan believes.

The key to success? No single person makes such complicated projects work, says SPL's DiPaula. "Be a team player. It is a collaboration."

"And it really doesn't mean that much until you hear people say, 'Ooh, that's cool,'" adds Weisberg. "Then you know you've achieved something." •

PRODUCT LIST: LAKE OF DREAMS

EAW	JF60 room control speakers; JF60-WP, UB72 and UB52 passive two-way speakers; SB-150P and SB180P 15" subwoofers; SB250P and SB625P dual 15" subwoofers	**Pioneer Electronics (USA)**	DVD-V7400 DVD player
		Extron Electronics	DVS204 video scaler; Cp8x8hv and Matrix50a matrix switchers
QSC	Basis 922 DSP & Cobranet I/O; CX254 Quad Channel Amplifier, CS302 and CX302V amplifiers; CX502, CX702, PL4, and PS6 dual channel amplifiers	**QLogic Corporation**	Sanbox5200 storage area network switch
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		Opto 22	Snap-Idc5-Sw control interface
		Raritan	Paragon II, KVM System
LCS Audio	LX-300 DSP System	**Elo Inc.**	1725I touch screen
Crestron	TPS4500 touch screen panel	**MOXA Technologies Co.**	NPORT5610-16 control interface
Middle Atlantic	equipment racks	**Snap Appliance Inc.**	4200 network storage
Pelco	CM9740 camera matrix, security cameras	**Hewlett-Packard**	Procurve4000 gigabit network switch
Sharp	20" LCD monitors	**NetGear**	GSM7324 gigabit network switch
SeaCam	1060T underwater cameras	**Barco Industries Inc.**	XLM-H25 2k video projector; ELM-R18 SXGA video projector
Dell Computers	Precision370 show control CPU		
Adrienne Electronics Corp.	Ltc-Rgi TC reader card	**Magenta**	MultiView 450a receivers, UTx transmitters
Apple/Macintosh	Power Mac G5, Video PB CPU; X Serve Raid, Raid Array Storage	**Brainstorm Electronics Inc.**	Sr-15 Plus time code interface; Sr-26 and Sr-3r time code interface