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Omega Mart:

Meow Wolf's
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As guests traverse the market aisles, they notice that the products (most of which can be purchased) aren't what they appear to be.

Supermarket Sweep

Step into the bizarre world
of Meow Wolf's Omega Mart

By Judith Rubin

In February 2021, Meow Wolf, an artists' collective turned entertainment company owner/operator, rolled out its second venue, Omega Mart, in Las Vegas. Omega Mart is the anchor tenant of AREA15, a new entertainment and retail complex west of the Strip. The joint venture of real estate development firm Fisher Brothers and creative agency Beneville Studios, AREA15 was included on the *Fast Company* 2020 list of ten most innovative development and real estate companies, and lauded "for debuting

an experiential next-gen mall in the Las Vegas desert."

Meow Wolf works to establish a sustainable model that supports artists and brings the public closer to art in novel, immersive settings, which *Las Vegas Weekly* has described as "wonderfully weird movies you can walk through." The Meow Wolf flagship, The House of Eternal Return, in Santa Fe, New Mexico, opened in 2016 with critical support from George R.R. Martin, and was honored in 2017 with a Thea Award. Meow Wolf is currently helmed

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The portal to AREA15.

by co-CEOs Ali Rubinstein (chief creative officer) and Carl Christensen (chief financial officer).

Describing the Meow Wolf experience, Marsi Gray, Las Vegas senior creative producer, says, “You start in a familiar place. From there, wormholes and portals transport you to unknown worlds.” Omega Mart begins in what is ostensibly a supermarket, leading to a network of media-rich spaces and storytelling that comments on consumerism and corporate culture. The adventure is open-ended and self-guided. Visitors can spend as much time as they like in the four anchor spaces and numerous individual art installations. According to Gray, the typical stay is 90 minutes to two hours, but some visitors breeze through more



quickly and others make a full day of it.

Matthew Swerdzewski, show lighting design manager, says, “It’s a very narrative experience, and there are parts of it that you can unlock—hidden storylines and levels.”

That Meow Wolf feel

Design and production took three years. Meow Wolf achieves its unique style with a combination of off-the-shelf products and customized tools plus a dedicated internal team working closely with consultants, suppliers, and the artist/storytellers whose work is showcased.

“Having good relationships with vendors means we could create at the cutting edge of those companies’ capabilities,” says technical director Brendan Carn, who references Ableton and Cycling ‘74 for custom audio spatialization



Above and below left: The Light Tunnel.

tools; Derivative’s TouchDesigner programming language for projection mapping and AV and lighting control; and TMB FloppyFlex LED neon for “addressable pixels in three-dimensional space.” The platform provided by Barbizon Lighting is “fairly straightforward, relying on ETC Paradigm for top-down, global control of the building, with a global lighting rig, High End Systems Rack Hog, and DMX-based lighting control with a lot of addressable pixels.”

“We’re trying to create innovative ways for all those systems to talk to each other in a way that produces that Meow Wolf feel,” Carn says. “We might have 20 – 30 simultaneous timelines interacting with each other. Guests have options, and all other projects in the space are aware of what everyone and everything else is doing; they’re monitoring, accommodating, and communicating, and, even if everything gets changed, they know how to migrate back.”

Each discipline is seen as creative, down to construction and maintenance. Mike Ostendorf, CEO of AOA, who, with 11 colleagues provided project management and other services, says, “Everyone that works on a Meow Wolf proj-



ect is an artist, even if you are an electrician. Everyone is challenged. There are no bad ideas. Every person on a project was allowed to participate as long as it worked within the narrative context Meow Wolf was creating.”

Many of those involved have roots in theatre. “Skill sets required in theatre-based work really translate,” says Gray. “Theatre people are quick on their feet, quick to respond in the moment.”

This article highlights some of the more innovative aspects of the project.

The grocery story

The Omega Mart supermarket, the entry experience, is one of four anchor spaces, each of which spans 4,000 – 6,000 sq. ft., with multiple elements, experiences, and portals.

As you traverse the market aisles, you notice that the products (most of which can be purchased) aren’t what they appear to be, and the lighting morphs from a standard big-box wash to psychedelic. The area’s main lighting designer was Matthew “Roz” Rosvold, one of the in-house team overseen by Matthew Swerdzewski.

Under contract to Meow Wolf, Barbizon Lighting provided, installed, and programmed architectural and stage lighting throughout, excepting elements designed and provided by artists for individual installations. A key feature in the grocery store area was the VPL 1220, a linear video pixel LED product from SGM Lighting. “It looks like a standard, 4’ fluorescent tube, and has the lumens for that basic output, but is, actually, a row of programmable LEDs,” says Peter Maurelli, Barbizon systems integrator. “It starts out looking and feeling like typical grocery store lighting, but then there’s a disruption and, after a few minutes of color changes and distortions, it goes back to ‘normal.’ It gives visitors a taste of what’s to come. You can add color and chase it from one end to the other and back. We worked closely with SGM Lighting manufacturer’s rep Doug Tuttrup, who has excellent product knowledge. It is one of their standard architectural fixtures more typically used on the outside of a building or attraction.”

“The lighting design team draws on a background in live entertainment to take concepts more often applied in the festival world and layer them onto the traditional environ-

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ment of the grocery store,” Swerdzewski says. “Using individually controllable fixtures with pixel mapping made it reactive in way that a normal grocery wouldn’t be, made it exist in those two worlds with the ability to create the narrative experience. We hide all the technology and the broader artistic idea underneath this supermarket, then use lighting to disrupt the normal environment.”

An audio track that, at first, sounds like a typical grocery store background is disrupted when the lights change. “We created hours of cheesy shopping music,” says Meow Wolf Show audio manager Matt Hettich. We needed a system that wouldn’t get repetitive and boring.” The team developed custom auto disk jockey software that chooses and mixes audio according to programming parameters; songs in the library are tagged by type. “It can run in perpetuity and never repeat itself,” Hettich says. “You never hear the same playlist twice, and it allowed us to take control information and send it to lighting or video in the space, so that when a takeover happens everything can respond in a dynamic, cool way. The auto DJ app became the backbone for many major show spaces. Using [the programming software] Max/MSP/Jitter and our other systems, we created something uniquely dynamic and interesting.”

Getting the shivers in the Factory

Another anchor space, the Factory, is, ostensibly, where Omega Mart products are manufactured. Described by Maurelli as “an adult jungle gym with many elements such as catwalks, slides, and interactive controls in some locations,” it includes large structural steel elements that were manufactured off-site and assembled inside the building.

Here, the Meow Wolf lighting designer was Jake Snider, and the shape-shifting lighting product of choice was TMB’s FloppyFlex, “a linear LED product with pixel control, like neon but flexible, and able to change color every 5,” Maurelli says. “Because it is very pliable, it can be applied to many surfaces. Jake used something on the magnitude of 3,000’ literally all over this space.”

Programming FloppyFlex with TouchDesigner facilitates a feeling of movement, as though factory machinery is operating. Also contributing to the illusion of movement is the kinetic sound design, which blends effects with mechanical sound. “All the surfaces are ringing and pounding and glowing,” Swerdzewski says.

“There are bass shakers under the walkway flooring to make the structure feel alive,” says Hettich, “and our creative mechatronic engineer Meason Wiley mounted about 40 solenoids to click on the metal structure of the staircase in concert with the sound as you walk up. There’s an amazing soundtrack and about 60 speakers in the space. To me, this is a shining example of what we want to do with sound at Meow Wolf. It’s a huge marriage of all different types of sound—recorded sound, sound design, and



mechanical things happening. It’s the definition of immersion, where you’re not just hearing but feeling. I got the shivers hearing it all the first time, during install.”

The interactive light and sound experiences within the Factory also include a console with which visitors can



The Factory is, ostensibly, where Omega Mart products are manufactured.

Photo: Kate Russell

operate a moving light. Spencer Olsen, Las Vegas creative director, explains, “The anomalous composition monitoring station uses capacitive touch buttons in conjunction with a

trackball to affect a moving head light nested within an icosahedron sculpture hanging from the ceiling. We tried to design this experience to have no wrong answers so, no



Above and opposite: Maurelli describes the Factory as “an adult jungle gym with many elements such as catwalks, slides, and interactive controls in some locations.”

matter what choices the user made, there would be a pleasing and immediate light and sound reaction.”

The surveillance video wall displays live, real-time feeds from cameras streaming the exhibition, and its control panel gives visitors some options to redirect the cameras and trigger other “resistance takeover” actions.

Meow Wolf’s Ben Wright was spatial audio engineer on the Factory. Other team members included Amon Tobin, (sound designer/composer); Rich DDT (oscilloscope synth, interactive music console); Moldover (music mill, interactive music console); Alan Watts (WAM, Beam Racer, BLOBS, light and sound interactive consoles), and Lucas Morgan (Enviral Design, TouchDesigner programmer).

Dramcorp and dehumanization

The Dramcorp space represents the offices of the fictitious corporate entity behind Omega Mart. A clue to its theme of dehumanization is the HR division, run by a robot.

Key features include the popular, 36-laser interactive harp (an earlier version is a visitor favorite at the Santa Fe venue) and the show-stopping Dramcorp Light Tunnel. The

Laser Harp, created by Meason Wiley, is controlled by visitors with hand movements. Meow Wolf senior sound technologist Les Stuck, who has concert hall experience, drove the acoustical treatment design that complements the sound design to virtually enclose this individual attraction within a large, open space.

Key team members involved in creating the Dramcorp Light Tunnel included Rosvold, Stuck, and Chris Beran (artist/exhibition creative engineer, programmer/developer), and Morgan (programmer/developer). Rosvold described “a fully immersive, synesthetic experience that is evocative of crossing through a transparent skyway. Patrons can see a low-resolution and distorted data image field of other dimensions that the tunnel traverses.”

“Depending on where you are standing in the tunnel, you notice sound is moving around you,” Beran says. “If you stay long enough, it evolves over time, with each mode having its own characteristic of sound and visual. It cycles through a series, not on a timeline, but more dynamic than that: In some cases, each mode will carry its own set of parameters and those can be set dynamically as opposed



to a rigid cycle. A lot of our pieces are that way.”

The effects rely on a large array of custom addressable LEDs recessed into the walls and rigged overhead. Rosvold designed custom content that was pixel-mapped onto this array. “The content moves and morphs with real-time, positional information from the spatial audio content, so that the visuals not only complement the audio soundtrack but also move in step with the movement of the sound in the speaker array.”

Stuck says, “We wanted a tight connection between sound and lighting, something much deeper than the usual amplitude-controls-brightness thing.” He composed the music in Ableton Live and used Max for Live to communicate musical events using OSC to talk to TouchDesigner. “Max for Live made it easy to capture individual notes, track amplitudes, panning, low-frequency oscillation (LFO) frequencies, etc., and send that data in real time to Touch. I included our spatialization system in Live, which included the ability to listen, virtually, from any place in the room as I placed the sounds and moved them. This made it easy to collaborate during the COVID-19 quarantine.”

As the team transitioned to install and testing in Las Vegas, Stuck updated the system to record separate audio files for each speaker, which would be fed by virtual Dante to the Q-SYS system. “I recorded all the OSC data into a text file that played in sync with the music. The final show software was a Max/MSP patch that played the audio files and OSC messaging in sync, and we iterated on that. If the room was closed for inspections, for example, I could keep working in my hotel room, render out audio and data files, then drop them into the show computer file system. Lucas, Chris, and Matthew could work on the video using the sound and data, while I worked elsewhere in the install. After creative reviews, it was easy to edit the music until everyone was happy and then have our final version running in sync with the rest of the exhibition.”

“We designed a TouchDesigner network that would receive data in real time, and use that data to generate dynamic, real-time video,” Beran says. “We had a full 3D model within TouchDesigner of all the pixels, made of LED strips, mapped out to DMX. It enabled us to combine video in a way to drive light, to program complex lighting

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networks and then, on-site, to really dig in and finesse the piece. In the tunnel—which is 13.5' high and 46' long—are more 100 DMX universes and several thousand LED pixels, which is quite a bit for one project, but TouchDesigner is a very flexible platform that allows working with very large amounts of DMX data.”

The physical structure and millwork were fabricated by MontBleau Architectural Woodwork; custom LED strips (fabricated by KrohTech), drivers, and power supplies were installed by Helix Electric. Key equipment used to bring the tunnel to life: A Superlogics media server running TouchDesigner, Enttec Pixelator rackmount pixel drivers, Enttec PLink Injectors, custom-built zone boxes housing the 12V power supplies and some 2,589' of Enttec 12V LED pixel tape.

Infinity in a projected desert

The elaborate Projected Desert anchor space is a Meow Wolf showpiece. “Guests are transported into a visual feast,” Gray says, “dipping from a serene desert setting into a surreal and beautiful psychedelic world portrayed by some of the world’s leading visionary artists.”

This space makes abundant use of video content, lighting, and projection mapping to “paint” the surfaces that include rocks, sculptures, and the Run Off Stream infinity pool. It includes the work of artists Amanda Sage, Android Jones, Cate and Samuel Farrand also known as Tetramode, Allyson and Alex Grey, Jonathan Solter, Luis

Tamani, and Luke Brown, collaborating with Cocolab, which provided the projection system design and master edit. Music and sound design were provided by Brian Eno.

“For this explorable, rockwork desert area,” Carn says, “Cocolab created all the show control software for the projection mapping and playback, and left room for communication with the audio system. The Meow Wolf team built the audio system and spatialization, with maps to the speakers, embedded in the rockwork. As the image moves across, the audio follows it around.” The projectors utilized in this space were primarily Panasonic laser projectors and short-throw Optoma projectors.

“Basically, the Projected Desert is a large, 2.5 story rockwork cavern,” says Ostendorf. “The rockwork had to be themed and also able to accept digital projection mapping. Coordination included getting the 16 projectors in the right places so as not to create shadows, as well as placing the speakers with an eye on performance as well as maintenance.”

Key team members on the Projected Desert included Meow Wolf’s Corvas Brinkerhoff (executive creative director, founder), Jon Haas (lighting designer), Carn, Alethea Avramis (creative producers), and Eric Davis (tech maintenance lead). Rockwork was provided by KHS&S, theming contractor on Omega Mart, working under the general contractor Martin-Harris.

Carn says, “We are always walking the line between what can be created without reinventing the wheel, and



Throughout the experience, mysterious characters make surprising appearances. See also this issue’s cover image.

Photo: Kate Russell



In the Projected Desert, Gray says, “Guests are transported into a visual feast, dipping from a serene desert setting into a surreal and beautiful psychedelic world portrayed by some of the world’s leading visionary artists.”

what needs to be custom-made, from hand-built technology—such as circuit boards and software that we design and build in Santa Fe—to commercially available, off-the-shelf products, resulting in a lot of collaboration with really amazing third-party companies and technologists.”

Barbizon Lighting’s support included network management and final programming for the Stream element, described by Barbizon’s Maurelli as “a video wall made flat in a cavity in the floor of the Projected Desert.” The surface is 2” of etched, reflective glass, and the display is pixel-mapped using Traxon Media Wall Paper. “Putting it under the glass creates the infinity effect,” says Maurelli. “We use TouchDesigner to create the sense of movement within the stream.” This idyllic, immersive imagery also extends the social commentary of Omega Mart as the Stream depicts manufacturing byproducts coming out of the Factory and flowing through the Desert.

Lighting: Traditional and beyond

Throughout the project, hardwired fixtures were installed by Helix Electric; cord-and-plug style fixtures were

installed by Barbizon Lighting. “We were lucky to have a crew of furloughed Cirque du Soleil technicians [the Cirque venues in Las Vegas were all dark due to the pandemic] led by Barbizon on-site supervisor Chris Kortu to install all this gear, coordinating with both Helix and Meow Wolf,” Maurelli says. “Chris brought many of his local resources to bear, designing and fabricating custom brackets and louvers for several fixture types. Once installed, Barbizon addressed and tested all the fixtures, then patched and programmed the fixtures using the Hog Full Boar and ETC Paradigm control systems.”

Barbizon provided the ETC system, including Emergency Lighting Transfer Switch and Myers inverter, to Helix Electric. The system was commissioned by ETC field technician Dawn Horstman, with Barbizon control specialist Braden Howard coordinating the Paradigm programming as well as the integration of non-ETC devices such as grandMA switches and Enttec Pixelators. “We delivered about 1,300 fixtures in a three-month period,” Maurelli says.

Additional team members included: from Barbizon, proj-

ect manager Dan Obenhaus and Meow Wolf technician John Masek; from ETC, project manager Kat Hsia and local programmer Donald Leffert.

Swerdzewski says, “Barbizon Lighting is able to take a very raw concept and apply a lot of permanent solution concepts as well as on-site management of installation, programmers, lighting technicians, and so forth, and that was monumentally important. My goal is to build a team of talented creative lighting designers and give them the tools to create something incredible, taking high-level concepts from creators and designers and turning them into experiences.

“I think we’re at the point now where we have to move past traditional lighting control, putting DMX and control systems that are based on traditional lighting consoles behind us—and go more into network protocol and custom control systems designed from the ground up for immersive environments. We are limited not by artist’s imaginations, but by the technology, and are pushing to not just adapt more industry-grade technology but to find and cultivate innovation.”

Beyond traditional sound

The term “spatial sound” was cited frequently in discussing the project. “We made a system to creatively move sound design and composition around, top-to-bottom, around the listener and visitor,” Hettich says. Key tools included Max/MSP programming software and Ableton Live music creation software, both from Cycling ’74, along with Q-SYS, OSC, and a vast speaker network installed by ProSound. “We have some of the best Max programmers in the world on our team, and in Max/MSP we built a system of custom tools. The system allows us to take a Wacom tablet and draw a path for the sound using a plan of the show or the room. It’s a quick way to visualize sound moving in space and it integrates directly into Ableton Live, our go-to digital audio workstation. A creative director can come in, work with the artist and modify as needed.

“For instance, in the Projected Desert, our senior sound creative lead Ben Wright took the different stems—bass, drums, keys, etc.—from Brian Eno’s music and moved them around the room in sync with the video. Ben would watch the video and tweak the path of the music around in real time, then listen again and keep tuning. This would be cumbersome with a more traditional system—we have 64-speaker rooms—so, our sound technology team built a system that didn’t really exist before, enabling us to do things quickly and dynamically. Because we don’t have the ability to time a user’s experience through the space, we use creative solutions, like a master tempo and quantized start times, to sync the show to itself.”

Technologist and sound designer Eric Heep was contracted as a creative Q-SYS programmer, sound designer,

and show audio programmer through Audio Focus. “We needed a language or messaging protocol to communicate with all the different tech disciplines in the show as well as the different audio systems,” Hettich says. “Q-SYS formed the global audio backbone like a big routing matrix, able to send audio around the building where it needed to go. OSC was the protocol used to send control information around. It was easy for us to share information with external artists and work with vendors and anyone who can understand OSC. If you want to do things with audio interactivity, you need to have a robust technology network that allows real-time control of spatial and generative systems.”

With the exception of a handful of contracted sound designers and artist contributors, including David Last, Audio Focus founders Brian Mayhall and Paul Groetzinger, Amon Tobin, Beach House, Brian Eno, and Santigold, most of the music visitors hear was composed by Meow Wolf team members. “Every single person on the show audio team is a sound designer and a practicing musician,” Hettich says. “Ben Wright held the overarching vision, but we all contributed to it.”

Hettich comments, “Audio is at this pinnacle as a key contributor to immersive experience design. I see a lot of really compelling stuff happening. We emphasize spatialization and more dynamic experiences, which means things aren’t looping but rather behave as an active, living, breathing part of the show. ProSound was a great resource. We’re now at the point where we could go farther, with time and budget and experience. Having 64 speakers in a space is great, but we could utilize twice that. It’s exciting to be in that place.”

The one-off of one-offs

A full-time, six-person tech maintenance team is engaged constantly on-site. “In Vegas, there are no dark days, so all maintenance is done late at night and early in the morning,” Carn says. The show manager/digital Watchdog system built by Meow Wolf’s Cathy Laughlin along with creative engineers, monitors everything. “It knows the state of every computer, restarts things automatically, and flags issues to the team. It lives in a tech maintenance area back of house covering about 1,000 sq. ft, whereas IT and fire life safety equipment are ‘in the exhibit’—in a locked room, but visible within a guest accessible area.”

Startup is “moving toward a simple, push-button operation,” Carn says. “The crew has to be there to do it, but we’re working toward a process that doesn’t take a huge amount of time and is straightforward and repeatable. The show manager turns on and off all displays and projectors, has automated control over most power, and can power-cycle through the show control software.”

The relationship with AOA, an established project management and construction management firm with exten-



Hendee Acres is designed to be a smaller, more relaxing area.

sive credits in theme parks, hospitality, and retail, began in April 2019, when Meow Wolf co-CEO and CCO Ali Rubinstein, who, like Ostendorf, is a Walt Disney Imagineering alumnus, retained AOA to assist in reviewing the delivery process. For Meow Wolf, Ostendorf is project management exhibition executive.

"We brought a few vendors into the mix, such as ProSound," Ostendorf says. "But we do projects holistically and have our own, in-house battery of resources, allowing us to provide construction management, production design, show design, some fabrication management, and some fabrication. We built all the low-voltage control boxes for the exhibition. A project like this is very much in our comfort zone because, like Meow Wolf, AOA never does the same thing twice. My team and their team worked together to manage all the outside artists, get them scheduled, and determine what was needed to do their art inside the exhibition in terms of what they did on-site versus off-site. We basically gave them a blank canvas in the room, walls and power, the parameters of their

space; they were set up to be turnkey projects."

AOA team members included Art Zargaryan, Erin Woodman, Joe Meoak, David Kucinski, Alexandra Carmona, AJ Campbell, Daniel Sandefur, Adam Lentz, Steve DeMichele, Jake Larsen, Mike Smarrito, Rachel Blake, Laura Camp, and Oksana Wall.

"What Meow Wolf is bringing to themed entertainment as a whole is mind-bending, super-creative art," Ostendorf says. "It's interactive and stimulating on all levels—whatever the visitor's age, they can find interest there, because everybody has some level of experience with art in their personal life. It's not a theme park, not a ride—it's a unique, one-off art exhibition with a story to it. The narrative encapsulates so much. It will influence and change the industry. I haven't seen one single person go through and not walk out with their expectations exceeded, even if they knew a lot about it ahead of time."

"There is now a really profound sense of accomplishment," says Beran. "We're excited to continue pushing forward, doing what we do." 📶