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A New Star Appears in Europe

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The Vortex Dome at Los Angeles Center Studios. All photos provided by the author.

From space to the stars: Ten years of arts and entertainment at The Vortex Dome-Los Angeles



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I love planetariums. My first dome experience was at the Miami Space Transit Planetarium. It changed my perception of the cosmos and stimulated my imagination with possibilities for virtual theatrical experiences.

As a teenager I wrote a science fiction short story about performers in the future who projected their consciousness directly onto large holographic domes. The performers elevated into the theater surrounded by a console with quartz crystal sensors and took audiences on cosmic journeys to other worlds—both real and imagined—using instrumentation that projected their mind onto the dome. Performers disciplined their minds to achieve crystal clear focus. If they wavered, the audience could become ill. When in tune, the audience experienced a sense of awe so great that people's lives were often transformed by the experience.

I directed my education and career into electrical engineering, knowing that technology was the future of art, entertainment, and wellbeing.

Planetarium engineer

After 7 years working as an aerospace engineer at Harris Corporation, I radically shifted my career in 1990 to work as chief engineer at Astronaut Memorial Planetarium at Eastern Florida State College in Cocoa, Florida

Working under Director Mike Hutton, my

team created the first hybrid planetarium by synchronizing a Digistar and a Minolta Infinium star projector which we demonstrated at IPS in 1994 in our newly opened 21m dome.

I next accepted a position at Spitz, Inc. (now E&S Spitz) where we pioneered the fulldome format and built a dozen early digital dome theaters in the late 1990's and early 2000's, including Papalote Museo in Mexico City, the Library of Alexandria planetarium (which hosted IPS 2010), and launched the SciDome digital projector system. I also worked with producer Mike Bruno to launch Spitz Creative Media.

Despite my love of science, the cosmos and immersive storytelling, our planetarium programming could not reproduce the incredible journeys I had imagined as a teenager. Arts and entertainment modalities were not a priority at most planetariums which - by necessity - were focused on informal science education. I yearned to push the boundaries of the fulldome format.

Vortex Immersion Media

I founded Vortex Immersion Media in late 2007 to expressly focus on fulldome arts and entertainment¹. We pitched a VR nightclub to Caesars in Vegas for a new attraction they were developing called the Linq. It includ-

¹ See vortexdomes.com

ed a gesture-controlled "immersive jockey" station, dancing avatars, photonic go-go booths and a fulldome dance floor. Caesars loved it! We also collaborated with Disco Donnie to plan a large inflatable projection dome as a venue for touring electronic dance music (EDM) artist Tiesto.

It turned out that 2008 was not a good year to launch a new company. As the economy eroded, the Caesars' Linq project stalled and the 40-m Tiesto dome was abandoned.

I decided to move my office to Los Angeles—the entertainment capital of the world—and use my remaining savings to build our own dome theater. Producer and development executive Kate McCallum used her industry connections to secure a location for the dome on the Los Angeles Center Studios lot in downtown LA. Kate had recently founded a nonprofit called c3: Center for Conscious Creativity, which was focused on the potential impact of arts, media and entertainment to inspire a better future.

In June 2010, Vortex installed a custom 15-m geodesic projection dome with negative pressure screen and vinyl cover. The first



Kate McCallum

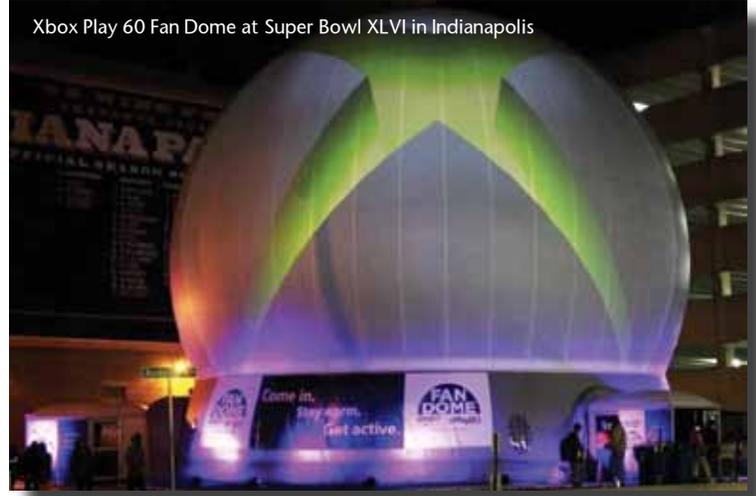
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Ed Lantz's title and background are included with his article. *Planetarian* readers may also remember him as the author of the Digital Frontiers column that appeared from 2005-2008.



Nike Quad Dome at Hollywood and Vine.



Xbox Play 60 Fan Dome at Super Bowl XLVI in Indianapolis



Nokia Lab Dome at SXSW in Austin, Texas.



Kinect in the Xbox Fan Dome at Super Bowl SLVII in New Orleans.

event hosted by the Vortex Dome was a c3 summit called State of the Arts 2010, which featured a live performance of Bella Gaia by Kenji Williams. With support from the planetarium community, we were able to project and showcase full-dome content. As projects rolled in we reinvested profits into acquiring our own projection system, video server, and lighting system and started co-producing original shows.

Experiential marketing

Our first clients were big brands who wanted to dazzle audiences with memorable experiences. The projects started to roll in—Nike, Microsoft, Nokia, NFL, EMC2 and more. The full-dome experience delivered!

Our first major event was the Nike Dome at Hollywood and Vine for the 2011 NBA All-Stars basketball games. The quad inflatable dome we rented presented formidable projection challenges. The venue included a half-court basketball court, gift shop, and art gallery. Thousands toured the space over the weekend.

Another early project was the Nokia Lab created for the 2012 SXSW gathering featuring a tri-dome inflatable design. This project featured our new dome server built upon Derivative TouchDesigner with real-time 3D capability. We ran movie clips, spun 3D models of Nokia's new phone in the sky, and simulated northern lights that users could interact with using a touch table. We also

projected live Twitter feeds and VJ'd for a live band.

Super Bowl 2012 and 2013

Vortex was engaged by the NFL Super Bowl Host Committee in 2012 to install and operate an 18-m inflatable dome structure to serve the nearly 1 million visitors anticipated at the Super Bowl Village, a temporary entertainment zone in downtown Indianapolis, Indiana. Microsoft's Xbox sponsored the dome and asked us to theme it. We created 3D animated visuals on the dome interior and contracted Pixomondo—who won an Academy Award for their visual effects on the film *Hugo*—to create animated visuals for the dome exterior.

Xbox invited Vortex back to create another dome venue for Super Bowl 2013 in New Orleans, Louisiana. On the interior of the 15-m dome we included a Kinect interaction station allowing visitors to throw simulated Mardi Gras beads, levitate a playing field with running football players, or spin Xbox brand elements around on the dome. A smaller 7-m dome was attached to the main structure which housed a photo booth experience as visitors exited the venue.

4D storytelling

Creating walk-through immersive experiences for big brands was fun, but it was far from the awe-inspiring immersive entertainment experiences that we longed to create. Storytelling experiences better fit our desire to explore next-generation immersive experiences.

EMC (acquired by Dell in 2016) contracted Vortex over three years to create a dome experience at their EMC World Conference, which attracted nearly 10,000 attendees. In 2012 and 2013 we created 5-minute "thrill rides" into the world of electronic information in an 11-m tilted dome. We worked directly with EMC's global brand managers to understand their message, hone a story concept, and produce a show.

In 2012 we flew audiences through a big "dataverse" showing how private and public clouds could be trusted to serve corporations. In 2013 we created a Tron-like world that we navigated in a "dataship" while that illustrated tools for IT security and governance. Both pieces included animation with live-action elements and visual effects.

In 2014 Adult Swim asked us to produce an experience featuring their "Meatwad" char-



EMC World 2012 (left) and 2013 (above)



Above and left: Adult Swim Full Dome Experience at Comic Con in San Diego, California

acter from Aqua Teen Hunger Force, the 11-m dome experience featured bright 20k lumen projectors to accommodate visitors stepping into the dome out of bright sunlight at San Diego's Comic Con.

Vortex produced the mobile dome theater and assisted London-based animators Golden Wolf with the story world experience. NSC Creative offered their theater for screenings and provided advisory support. The result was a stunning show that dazzled Comic Con visitors two years in a row.

That same year we were contracted by NBC Universal to create an original experience for the launch of *Constantine*, an upcoming series based on the DC Comics character and 2005 film starring Keanu Reeves (that was shot on our studio lot).

We had 6 weeks to deliver a 3.5-minute animated themed experience. It took 3 weeks just to get the script written and approved! Thank goodness for the 6,000 core render farm down the street. I directed the experience, including flythrough of a creepy sanatorium and collision with a ghost train while combating demons. Synchronized 4D effects included wind and strobes. We ran 1,200 shows packed with 50 people per show.

Live entertainment

Vortex was first drawn into live entertainment through our Artist In Residence Program led by Kate McCallum's nonprofit c3: Center for Conscious Creativity.

Our first artist was Audri Phillips, a digital visual effects artist with substantial credits in Hollywood. Audri collaborated with musician and composer Winter Lazerus from Kate's boutique arts+music label called the ART OF SOUND and together they created two albums and a crowdfunded show called *Migrations* which premiered at the Vortex Dome in 2011.

Audri then collaborated with choreographer Stefan Wenta to create a 360 ballet called *The Blue Apple* which was funded by a \$50k grant through c3.

Esther Shapiro, former senior vice president for miniseries for ABC Television and co-creator of *DYNASTY* exclaimed that "... this feels like the next big thing!" Audri is now producing *Robot Prayers*, a "techno conscious sci fi fantasy filled with ever evolving virtual and real characters seeking the truth of who they are." The dome show features real-time interactive dance performance.

Artist and singer Amrita Sen and composer

Anthony Marinelli pushed the envelope with their mixed media musical *BollyDoll*, which was performed to a public audience. Audience response to live performances was off the charts. We sold out many shows at \$35-\$45 per ticket and our newer productions will demand \$100+ ticket prices.

Pharos was a mobile dome show featuring Childish Gambino (aka Donald Glover) located in the Joshua Tree desert². Gambino performed five shows over three days in a 49-m inflatable dome theater with a 2500-person capacity.

The Microsoft-backed production team led by animators Mikael Gustafsson and Alejandro Crowfor spent two weeks in the Vortex Dome preparing the show, which was VJ'd live from dual Unity servers outputting 4k x 4k and re-mapped onto a 12-projector display at 60 fps. *Billboard* raved that "...the dome was truly the highlight of the night," and Hip Hop DX called it "... the most innovative live show this decade."

The largest dome we delivered was a 60-m inflatable structure at the LA Coliseum produced by The Production Club for a well-known game designer. He invited 3,500 of his "closest friends" to enjoy an immersive EDM party with the music of DJ's Skrillex and Diplo under the magic of 360 imagery.

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² To watch the 360 video of Donald Glover performing in Pharos Dome, go to <https://www.youtube.com/watch?v=coWcTgUSPZ4>

Vortex collaborated with artist James Hood on two 360 music+arts projects. Ceremony was performed live at IMERSA, the Jena Fulldome Festival, and the Hamburg Planetarium. A piece from Mesmerica was featured at the Immersive Film Festival at the Espinho Planetarium in Portugal, at the Fulldome Festival in Jena, and will be screened at the IPS Film Festival in Toulouse.

Mesmerica is a cross-platform production including a live performance, a fulldome film for distribution and a companion VR experience. Directed by Michael Saul, it features James Hood's beautiful music set to world class fulldome art.

The show is expressly designed to activate positive brain states and a sense of wellbeing. Contributors include Jonathan A.N. Fisher, PhD, an assistant professor and director of the Neurosensory Engineering Lab in the Department of Physiology at New York Medical College, who provided brain visualizations from Neurodome®, and Mark Subbarao, PhD from the Adler Planetarium in Chicago, who provided a galactic zoom and brain sequence renders.

Pianist and composer Peter Manning Robinson performed *Refractor Piano* in The Vortex Dome with visuals by Hana Kim and Klaus Hoch. The concert was captured and live streamed in 360 video.

Other applications

A wide range of productions have been explored in The Vortex Dome, including traditional film screenings, performance art, EDM events, poetry readings, experimental art, meditations, workshops, panels, immersive dining experiences, a Teletubbies premiere party, and more.

Video shoots in The Vortex Dome include an MTV pilot for a global multi-cast dance party, two *60 Minutes* episodes, a scene from the TV series *Castle*, an independent sci-fi film, music videos, documentary interviews with legendary jazz musician Wayne Shorter and rapper Chuck-D from Public Enemy, and most recently a futuristic set for Jay Z's music video called *Family Fued* with Beyoncé. We regularly shoot and live-stream 360 video of events.

Paul Allen's holodome

In late 2015 a Request for Proposals from Paul Allen's Vulcan³ was released seeking proposals for a "Holodeck." It was a challenge that I could not refuse. We mounted a cluster of 4k projectors aimed into a semi-spherical screen driven by full-sphere equirectangular movies from our Touch Designer playback and remapping server and a separate Unity server. Vulcan refined our prototype system for public use and recently opened the Holodome at the MoPop museum in Seattle⁴.

Vortex collaborates with local universities, including CalArts (fulldome curriculum and student showcase for three semesters) and has presented an "introduction to fulldome" for USC's Animation and Entertainment Business departments, University of Texas LA, and the LA Film School and the Art Center. We've also co-produced digital media labs for high-risk foster youth through the nonprofit Create Now. We also hosted MORPHOS, a summer artist-in-residence program with Ethan Bach and five artists who showcased their work in the dome to a live audience.

Lessons learned

Corporate Events. Digital planetariums can easily attract well-funded corporate events. You'll need to get good at reading mood boards and accurately projecting logos and brand elements according to brand guidelines. Expect demanding clients and short production timelines. Market your theater to local brand managers of Fortune 500 companies and pitch exhibitors at upcoming conferences, festivals and sporting events well in advance of the event. Companies often seek local venues for parties, presentations,

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³ Vulcan Inc. is a privately-held company founded by philanthropist, investor, and Microsoft co-founder Paul Allen. It was established in 1986 and oversees Allen's diverse business activities and philanthropic endeavors. Wikipedia

⁴ Read more: Owen R. Smith, "Vulcan's Holodome exhibit at MoPOP lets groups share an 'immersive reality' experience," *The Seattle Times*, May 4, 2018; www.seattletimes.com/entertainment/vulcans-holodome-exhibit-at-mopop-lets-groups-share-an-immersive-reality-experience



Television/movies



Dance



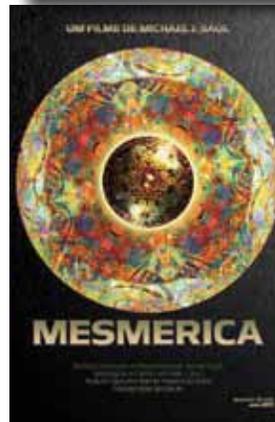
Blue Apple Ballet



Mixed media musical



James Hood/live performance



product launches and more.

Film and Video. Make sure you let your local film commissioner know that your planetarium is a unique venue available for select productions.

Live Music. Most planetariums can accommodate solo artists and small ensembles. You'll need gentle lighting that you can control, a small stage area, extra utility outlets, a good sound system, an audio mixer, some microphones, and an audio feed from the stage to your sound system. Items not in-house can be rented or provided by the performer.

Musicians who have large social media following can usually draw an audience. Remember, the dome is a very special performance space with limited seating - it is reasonable to charge more for tickets than an ordinary venue. Looping or static backdrops with slow transitions can suffice for the bulk of a performance, with an occasional "whiz-bang" immersive effect. You don't want the dome to steal the show. Ask for the song list in advance and work with the artist on a theme for each song.

Theatrical Productions. Live performances including theater and dance are the most challenging formats for digital planetariums. Performers typically want foreground set pieces, a large stage with wood and marley flooring, dressing rooms, theatrical lighting and more. Touring performances must adapt to digital planetariums on a case-by-case basis.

Visual Music Entertainment. In the past, planetariums supplemented their revenues with ticket sales to evening laser light shows. Currently there are only a small handful of full-dome music entertainment shows. Vortex is producing original SciArt entertainment programming for planetariums that merges scientific visualizations with music and art.

License Rights. Make sure you have the proper rights to use third-party content for commercial events. Royalty-free stock imagery—both stills and video—is inexpensive and can be creatively mapped and manipulated in real-time or in post. Stock full-dome imagery is increasingly available from the full-dome community, which has been very supportive in our work. Full-dome imagery is also available under creative commons license with proper crediting.

Future of immersive experiences

We see digital domes as the out-of-home entertainment format of the future. "Generation VR" will demand alternatives to passive flat-screen entertainment and proscenium shows.

Vortex is focused on building a global network of arts and entertainment dome theaters while empowering artists to create transformational entertainment that—as closely as possible—bridges the mind of a performer to the mind of an audience. Vortex is not the only entrant in this space. MSG Entertainment recently announced the construction of The Sphere in Las Vegas and London, a \$360-million (U.S.), 152-meter diameter LED dome with 18,000 seats.

I remain close to my planetarian roots. Media sociologist Marshall McLuhan once said, "Anyone who tries to make a distinc-

Center, top: Artist Paul Heussenstamm viewing his mandala art in the Vortex Dome with VR headset. Center, below: Chuck D. of Public Enemy interviewed by DJ Lance Rock (Yo Gabba Gabba) in the Vortex Dome.

tion between education and entertainment doesn't know the first thing about either." With all due respect to McLuhan, not all entertainment is educational. However "entertainment" and "engagement" are nearly synonymous. Education should be engaging if it is to have a deep and lasting influence.

Digital planetariums merge science and art in awe-inspiring ways that no other medium can. They especially favor Hutton's Deep Time journeys⁵, Christian's Big History storytelling⁶, Montessori's Cosmic Education⁷, and other Great Story variations⁸. Under the dome we can contemplate the big questions of life, experience the thrill of travelling through space, time and mind, be moved by powerful music and art and visualize possible futures for humanity.

Digital domes were birthed in a community devoted to meaningful media and life-affirming programming. We seek to retain these values as the format expands into mainstream arts and entertainment. ☆

⁵ David Farrier and Aeon, "How the Concept of Deep Time Is Changing," *The Atlantic*, October 31, 2016

⁶ See for instance www.ted.com/talks/david_christian_big_history

⁷ Camillo Grazzini, "Maria Montessori's Cosmic Vision, Cosmic Plan, and Cosmic Education," *The NAMTA Journal*, Vol. 38, No. 1, Winter 2013

⁸ See for instance thegreatstory.org/what_is.html