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## Live from the Digital Dome By Sarah E. Herbert and Judith Rubin

The theatrical potential of full-dome systems makes it possible for operators to think of their digital theaters as cultural venues capable of housing a wider variety of productions and look about them for collaborative opportunities with educators and arts groups.

“We want to use new multimedia technologies to achieve new dimensions of aesthetic and to appeal to the senses and the emotions of our visitors. Our aim is to touch the hearts of the audience and thus arouse their curiosity about science and even abstract and difficult subjects. Multimedia enables us to educate in an entertaining way.”

—from the mission statement of the Mediendom in Kiel, Germany

The digital technology now available for multimedia programming raises “the potential to harness the energy of the dome.”

—Kenji Williams, violinist and producer of *Bella Gaia*, one of many new live multimedia experiences in the digital dome growing out of collaborations between planetariums and museums, artists and universities

“Instead of using the visuals as a backdrop for the music, or the other way around, in *Life Out There* the visuals, science and music were all on par.”

—KaChun Yu, PhD and curator of space science at the Denver Museum of Nature & Science

## Unique challenges in staging

Unique challenges arise when adding live performance to the digital dome. “Many think that the lighting and staging ruin the immersive effect of the display system,” says Dan Neafus, director of the Gates Planetarium at DMNS. “On the contrary, a well designed digital display environment is very much enhanced by proper use of theatrical lighting

and effects to link the performer to the dome screen.” Innovative programs around the world are integrating digital video with theater and literature, spoken word performance, music and dance, art and science.

Examples of digital theater as cultural venue include

- *ICH2*, an interactive dance performance developed specifically for full-dome planetariums (Mediendom, Kiel Germany);
- *Il Mondo della Luna (The World on the Moon)* Haydn’s opera, adapted for full-dome planetarium (Hayden Planetarium, New York);
- *Galileo Live* (Montreal Planetarium et al);
- *The Little Prince* (Hamburg Planetarium);
- *Moby Dick* (Hamburg);
- *Bella Gaia* (Denver Museum of Nature & Science);
- *Life Out There* (DMNS); and
- *Spontaneous Fantasia and The Omnicentric Universe* (J-Walt).

## Making it happen

*ICH2* was produced in 2008 at the Mediendom in Kiel, Germany, in partnership with the Muthe-sius Academy of Art and Design and the Kiel Ballet. Two dancers were recorded and projected onto the dome using motion tracking cameras, while sensors on their bodies reacted to their movements to produce sounds.

The two dancers interacted with the images and sounds in real time, transferring motion between the dome above and the central space below on a curving stage, reminiscent of a Moebius strip, built especially for the performance. The performance

was produced using vvvv software and displayed on the E&S Digistar 3 system.

Taking a page from the current theater trend of projected backdrops, Haydn’s opera *Il Mondo della Luna* played for 5 nights in January, 2010 at the Hayden Planetarium at New York’s American Museum of Natural History (AMNH).

The story features a sleeping potion induced trip to the moon that made use of NASA photographs of the lunar surface, shots of the Earth from space, shooting stars, exploding galaxies and fanciful images created by Phillip Bussmann and displayed on a Global Immersion Fidelity Bright projection System.

The Zeiss Mark IX star projector provided more than a celestial backdrop in the immersive environment; the audience was transported along with the Gotham Chamber Opera’s characters to the wildly alien surroundings.

From October 9, 2009 through January 10, 2010, *Galileo Live* played at the Montreal Planetarium with one actor revealing the story of



The projector is the star (Top) in New York’s Hayden Planetarium, where Marco Nisticò and Rachel Calloway started in Haydn’s opera *Il Mondo della Luna*, and (Bottom) in Hamburg, where Rudolf H. Herget recited and performed *The Little Prince*. Top: Courtesy American Museum of Natural History; Bottom: ©Hardy Brackman, Planetarium Hamburg, used with permission.

Sarah E. Herbert joins Judy in writing for this issue; she is a journalist for the attractions industry with a background in education.



Symphony in blue: (Left) Jazz rocked the Gates Planetarium at the Denver Museum of Natural Science's monthly Science Lounge; (Above) The Montreal Star Theater hosted *Galileo Live*; (Right) Joan of Arc looks to the stars in a Gates production by design students from the University of Colorado Denver. Left and Right images courtesy Gates Planetarium; Above by Sophie DesRosiers, Montreal Planetarium.

the astronomer's life, interacting with images of 17th century Italy, Galileo's daughter and other virtual characters, projected onto the dome and supplemented by the Zeiss IV-B starfield.

The production was the result of collaboration between four institutions: the HR MacMillan Space Centre in Vancouver, the TELUS World of Science in Calgary, the Manitoba Museum Planetarium in Winnipeg and the Montréal Planetarium, travelling to each for a run of performances.

Science and literature come together regularly in the Star Theater series at the Hamburg Planetarium in Germany, using the E&S Digistar 3 SXR. Currently showing is *The Little Prince*, a story which begins on another planet.

Last spring an adaptation of *Moby Dick* ran, which highlighted the system whalers used to navigate by the stars. In addition to the one actor on the stage, *Moby Dick* also employed a percussionist to convey the sounds of the sea, waves, wind, and storm, even the singing of the whales.

## Collaborations

The theatrical potential of full-dome systems makes it possible for operators to think of their digital theaters as cultural venues capable of housing a wider variety of productions and look about them for collaborative opportunities with educators and arts groups.

*Bella Gaia* presents a successful model. Kenji Williams, violinist, award-winning director and producer of 15 albums, met DMNS's Yu in New York in 2006. They discussed Williams' idea to bring the experience of seeing Earth from space and without political boundaries to the general public.

Williams had already built relationships with a former astronaut who inspired his idea, and also with Carter Emmart, director of astrovisualization at AMNH's Rose Center for Earth and Space, who showed Williams how

to use Uniview software for real-time navigation of star system databases.

The conversation between Yu and Williams continued over the next year, leading to the pilot program, *Gaia Journeys*, in 2007 at the Gates Planetarium. Williams was drawn to the immersive quality and unique appeal of the dome.

"Planetariums have a special role in society," says Williams. "Apart from churches and temples, they are a non-religious place to connect with the universe."

Verbal narration is sparse. Williams' live violin performance does most of the talking, in tandem with images of our planet from deep space, low earth orbit, and closer views of selected regions meticulously choreographed and edited for the dome.

*Gaia Journeys* made use of the Uniview to provide an accurate representation of the Earth's place in our universe, periodically zooming in to Earth-bound imagery from around the world by Greg Downing, spherical panoramic photographer.

The idea itself—a visual journey around the Earth accompanied by live music—was simple enough, but technically complex to realize. Yu and Williams worked remotely for several months, mapping out the performance and putting test animations online to view and discuss.

Pacing and a keen sense of the visitor experience were important. "Flight paths and camera movements need to be slower in the dome than on a flat screen, because there is more to take in for both pre-rendered images and 'fly-ing live,'" explains Yu.

"In *Gaia Journeys*, the images were slowed down even more because Williams wanted to give the same experience as people have traveling into orbit—slow and graceful—then, into

Downing's (panoramic) bubbles, even more slowly to give them time to attend back and forth between visuals and Williams' performance."

Another week of rehearsals in Denver culminated in four consecutive live evening performances.

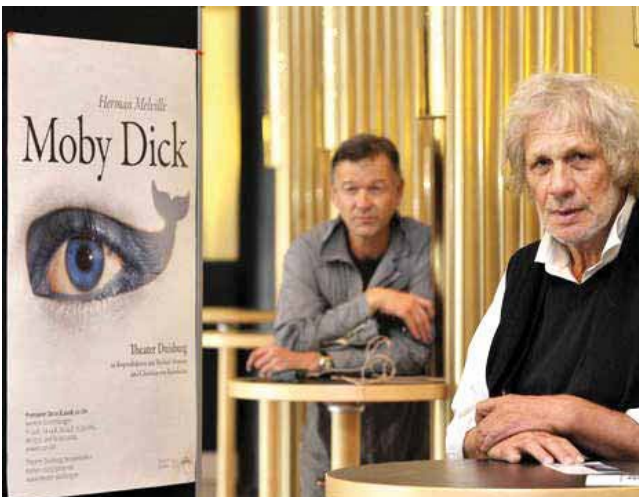
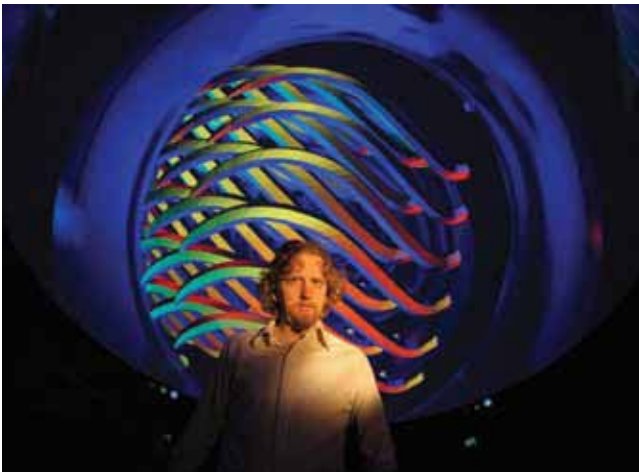
*Gaia Journeys* was a scripted experience but, for those four performances, it was live play for the music, lights, and visuals. The video portion is now pre-rendered in *Bella Gaia*, with the addition of scientific visualizations (of sea ice and ocean temps, for example) and HD footage of New York, Egypt, and Japan shot by Williams in place of Downing's photographs.

With the success of *Gaia Journeys*, the Gates Planetarium and DMNS went on to produce other multimedia shows for the digital dome. First piloted in November 2009 and subsequently used to kick off the first installment of the Museum's Science Lounge series, *Life Out There* is a multimedia search through space and time for the origins of life.

The House Band to the Universe played four sets of jazz to a mix of pre-rendered video animation, photographs, PowerPoint images and real-time visuals on the Global Immersion Fidelity Bright system. Between music sets, the visuals repeated as band member/astrobiologist Dr. David Grinspoon described the science displayed in the images.

## Theaters and universities

In Germany, the Hamburg Planetarium and the Mediendom offer instructive examples of successful collaborations in creating live multimedia shows for the digital dome. Most musicians, actors and artists are usually quite approachable and enjoy experimenting with their arts, suggested Thomas Kraupe, director of the Hamburg Planetarium. He recommends getting out, being involved in the community, seeing performances and meeting musicians to initiate the relationships which bring about collaborations among theatres, univer-



The many faces of the planetarium: (Top) Kenji Williams and *Gaia Journeys* at the Gates Planetarium (courtesy of the Denver Museum of Nature and Science); (Center) J-Walt and *Spontaneous Fantasia* (photo by Paul Buehler, used with permission); and (Bottom) Michael Altmann (front) and Christian von Richthofen, performers of "Moby Dick under the stars" at the Hamburg Planetarium. ©Sascha Kreklau, used with permission.

sities, arts organizations and planetariums.

Much of the content for Star Theater and other programs at the Hamburg Planetarium come from ongoing teamwork with Hamburg's Altonaer Theater. "Pick a theater in town and build a relationship," Kraupe says.

"With the Altonaer Theater we sit together and discuss what to do next."

Classes in the Medien-dom, housed at the Kiel University of Applied Sciences, give students hands-on experience to create multimedia productions of what Kiel bills as "novel pedagogical depth and visual attraction." The technology in this digital dome theater, which doubles as a classroom/lecture hall and work space, prepares students for a masters in Multimedia Production.

"Now that people realize they can do more with digital media, they have to come up with the content," notes Markus Schack, Medien-dom technical director. Allowing students the opportunity to take part in producing dome experiences can lead to unexpected creative results, such as the dance performance *ICH2*, mentioned above, and *Joan of Arc*, an experimental prototype developed by Laura Cuetara and digital design students from the University of Colorado Denver presented at DMNS. The UCD students were tasked with set design and animation. Neafus observed that today's digitally saturated students have great aptitude and enthusiasm for this kind of work when well directed.

### Jammin' in the dome

Combining music with visuals and effects to entertain and educate audiences has been a tradition in planetariums for decades; Laserium is probably the best known example. Shows often include real-time improvisation and artists can now tap into vast digital resources, musically and visually.

One example is an interactive cluster of digital spheres created by Bastian Barton at Kiel's Medien-dom. While Jens Fischer plays guitar, Barton flies through the field of spheres, each containing a different land-, sky- or space-scape into which he can delve, taking the audience through galaxies,

deserts, clouds or mountains.

Another is *le voyage abstrait*, which has been playing at the Hamburg Planetarium on first Wednesdays for a good seven years (since 2003). Constellations and computer animations by Thomas Kraupe and laser effects by Simon Bottcher synchronize with chill classic and electronica music by Raphael Marionneau and talented guest musicians or DJs each month.

J. Walter "J-Walt" Adamczyk takes the mixed media storytelling voyage to new worlds with live digital animation performances in a series he began in 2004, titled *Spontaneous Fantasia*, which has bookings in flat screen venues as well as domes.

J-Walt cites as a chief inspiration the Lumia light sculptures created in the 1930s by Thomas Wilfred, which were created live in front of the audience. The improv factor allows J-Walt to adapt his program on the fly to the given projection system and dome tilt of any location, blending color, music and movement.

*Spontaneous Fantasia* is now plug-and-play on Sky-Skan systems after J-Walt worked with the Digital Sky 2 software to create a plug-in.

Having performed in a wide variety of venues, J-Walt prefers digital domes because of what he terms their "egocentric format," which allows the audience to become characters traveling through his "imaginary, allegorical universe" of digital art.

*The Omnicentric Universe*, J-Walt's latest, revolves around the themes of cosmic and personal exploration. He creates a planet in real time and populates it with plants, artifacts, and dancing creatures.

Adding the drawing tablet to his technical setup has been pivotal for J-Walt's ability to create characters and environments with movement and body language. "The whole reason of performance is the organic gesture," he says. "Theater, music and dance are worthwhile because there is the presence of the human gesture."

### Unique challenges for operators and producers

When adapting a production for a full-dome environment, the most precious resource is dome time, according to Kraupe. "You don't usually have the money for lots of time and lots of people," he points out. "The planetarium has lights; instead of thinking you need to squeeze in all of your cables and lights and 20-50 performers, get rid of your equipment and try to find the essence of the performance."

Outside groups will often express great interest in using the Gates Planetarium to bring in their favorite visualization software tool (which typically outputs a single channel of video) for an artistic endeavor, according to Yu, only to droop when they see the complex-

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Joan of Arc in prayer under the Gates Planetarium dome in an effective display of lighting and full-dome projection. Photo by Dan Neafus.

create pre-rendered sequences is much easier and has provided visuals for some of our other media experiences, such as the Joan of Arc show.”

It takes time to program the software in conjunction with the performance and to optimize the sound and lighting systems before a show reaches plug-and-play status. However, “the results are worth the effort and the time it takes to manage all of the production elements such as body mics, sound levels and queuing,” says Neafus.

A theatrical production has specific and critical lighting needs quite different from other types of shows, but in agreement with Kraupe, “it can be done without too much cost using modern LED and automated theatrical fixtures configured to light the performers,” says Neafus.

In terms of these theatrical shows, those we spoke to testify that the visitor has a more powerful experience than in a traditional setting. For those spaces that double as high-tech classrooms, the added power may translate into educational benefits as well.

J-Walt describes it as “the difference between driving through the country, encapsulated, looking through the window, and stepping out of the car to be fully in that space.”

Kraupe cautions that maintaining a balance is very important, especially in preserving the live element that is the vital distinguishing factor. “Be careful not to knock down the human element with this very powerful visual system,” he advises.

“If used incorrectly, you will not hear the human voice. Especially in a 21 m dome, the audience always needs to connect; people need to feel the human presence and a good actor will fill the space with his presence.”

### Finale

Meaningful and effective live programming is evolving throughout the world and IMERSA is tracking the creative and effective utilization of the digital dome. As theatrical performances move into our domes, careful attention to every detail becomes both the challenge and an opportunity to balance communication between the performer, the immersion and the audience.

“It doesn’t need to be esoteric,” says Hamburg’s Kraupe, “but planetariums can be spiritual environments where we are touched by something bigger and can tell stories that capture the spirit.”

### Coming up

The 2010 Symposium for Media and Museum Professionals and IMERSA Full-dome Summit will be held 26-28 October. Presented by the Denver Museum of Nature & Science (Gates Planetarium) and the Jackson Hole Wildlife Film Festival. This three-day conference will have workshops, panels, screenings, exhibits and pitching opportunities.

Session strands will be focused on the newest in 3D, full-dome, content to go and creative fundraising options. The full-dome strand is sponsored in part by IMERSA. For further details visit [www.imersa.org](http://www.imersa.org) or [www.jhfestival.org/jhsymposium](http://www.jhfestival.org/jhsymposium). Contact Dan Neafus or Ed Lantz to inquire about participation (papers, screenings, panels, sponsorship).

### IMERSA website updated

IMERSA.org has a new look and new features to build online community and help spread the word about digital dome technology and immersive media. Check it out. ☆

(IMERSA, continued from Page 41)

ity of the system: six projectors, blended, tiled and geometrically corrected, with the same software running on six computers all talking to each other simultaneously.

However, Yu continues, “having animators

## PARTYcles

Alex Cherman

