The Theater in the Museum

a look at recent installations

by Michael Reid

New digital theater technologies are helping some museums and science centers attract new visitors, fulfill educational objectives and generate revenue.

Digital 3D Cinema

Digital 3D theaters come in all shapes and sizes and are limited only by budget and space. "Turn-key digital 3D systems start at $150,000," advises Roberta Perry, VP of business development at Edwards Technologies (ETI). In conjunction with Panasonic, ETI offers digital 3D packages for 100- to 250-seat theaters (2,000-3,000 square feet). The package includes dual digital projectors, digital surround sound, a high definition video server and a silver 3D screen up to 30-feet wide. They also provide all the necessary services to take a facility right from the concept stage to the premiere - including site evaluation, design, project management, installation, training and maintenance - as well as optional content packages through nWave Pictures.

ETI digital 3D installations at museums include a 180-seat theater at the Aquarium of the Pacific in Long Beach, CA, a 130-seat theater at the Taco Bell Discovery Center in Santa Ana, CA, and a 250-seat theater at the Science Museum of Minnesota (SMM) in St. Paul. Interestingly, SMM already had a well-established giant-screen theater, the William L. McKnight-3M Omnitheater, a convertible theater providing both dome and flat-screen exhibition. Mike Day, senior VP of museum enterprises explains, "We've operated an Imax theater for over 20 years now but opening the digital 3D theater in November 2003 fulfilled a different audience need and offers us even greater flexibility." According to Day, the Imax theater gets about 600,000 visits annually and the 3D cinema attracts about 1/5 that number.

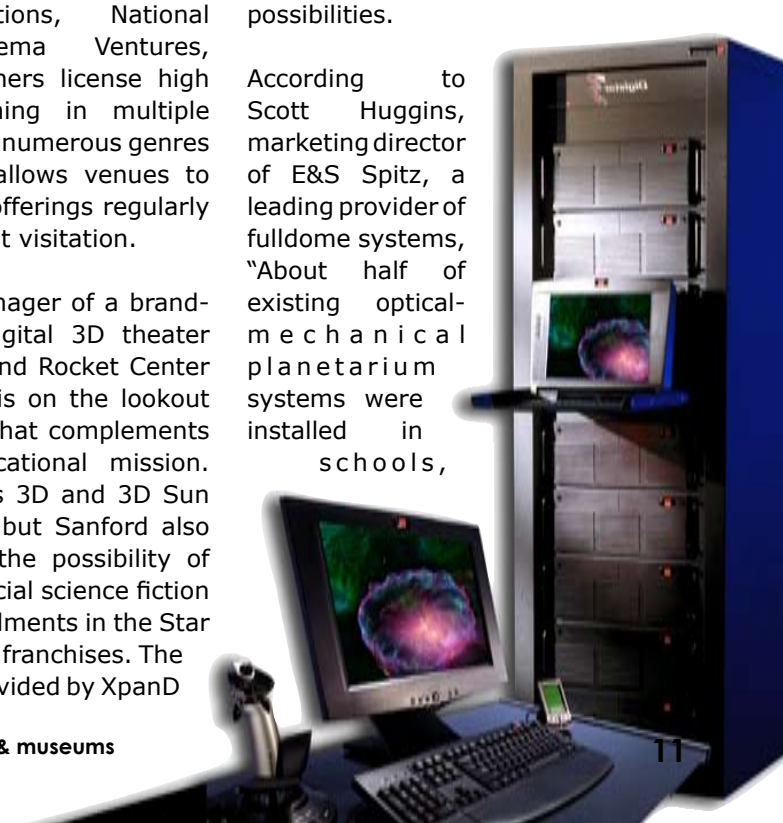
Roberta Perry finds that ETI clients are choosing 3D theaters for three main reasons: "As a way to increase repeat attendance, to capitalize on customer's excitement about 3D and the new and exciting content being produced for digital theaters."

Indeed, off-the-shelf content options now abound. Producers and distributors such as nWave Pictures, K2 Communications, National Geographic Cinema Ventures, Showscan and others license high quality programming in multiple digital formats and numerous genres and topics. This allows venues to change their film offerings regularly to help drive repeat visitation.

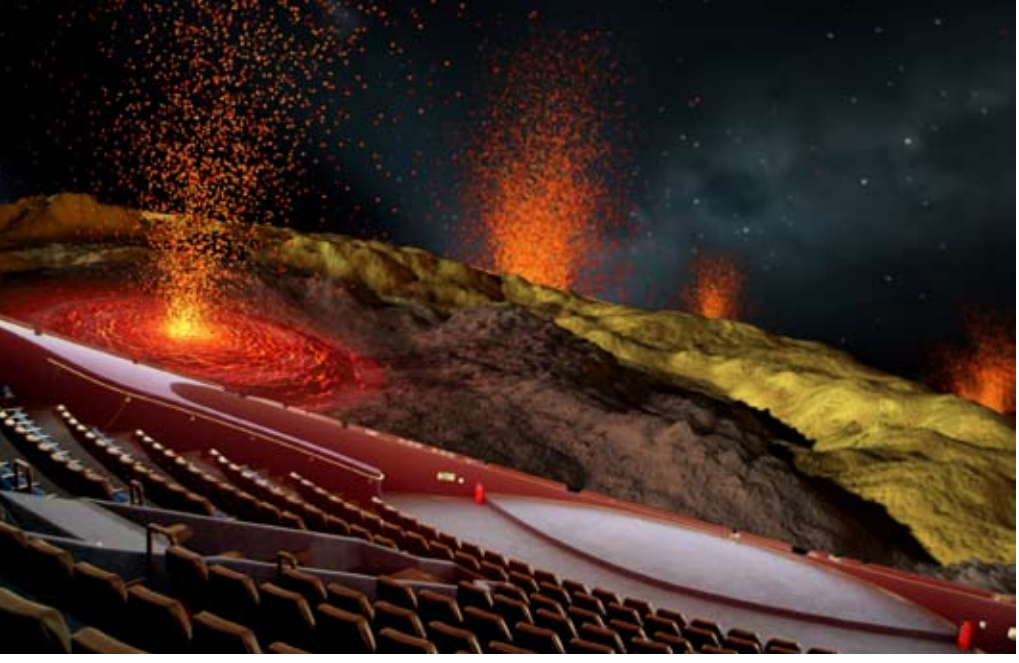
Greg Sanford, manager of a brand-new, 350-seat, digital 3D theater at the US Space and Rocket Center in Huntsville, AL, is on the lookout for programming that complements the center's educational mission. Opening with Mars 3D and 3D Sun was a natural fit, but Sanford also looks forward to the possibility of screening commercial science fiction films such as installments in the Star Trek and Star Wars franchises. The 3D theater was provided by XpanD - according to Sanford, selected for image brightness and ease of use. For an $800,000 investment it was completely outfitted with digital projector, screen, speakers, system software, wiring, right down to the infrared 3D glasses and seats. As did SMM, the U.S. Space and Rocket Center already had an established Imax giant-screen theater, but since opening the digital 3D theater in February, they haven't seen a decrease in Imax ticket sales. Sanford says, "We have always tried to stay on the cutting edge and adding digital 3D is the next step for giving people the latest technology."

Digital Fulldome Video

Digital fulldome systems are rejuvenating planetariums and dome theaters around the world while also opening up a world of interactive scientific, entertainment and artistic possibilities.



According to Scott Huggins, marketing director of E&S Spitz, a leading provider of fulldome systems, "About half of existing optical-mechanical planetarium systems were installed in schools,



colleges and regional museums back in the 1960s and '70s. Today, prices for that technology start at around $350,000, whereas the new digital fulldome systems being sold to replace or upgrade these are about $150,000 - $180,000. In other words, it's actually cheaper to purchase a new digital system."

One of the unique features of fulldome is the ability to exhibit both real-time and pre-rendered content, or a combination of the two. Real-time content, such as interactive animations or live images, enables the creation of custom presentations using a mix of sophisticated software tools that come with the systems and proprietary techniques developed by the operators themselves. Training and on-going support are provided by the vendors but some of the best results are achieved simply through trial and error.

"You are only limited by your imagination in terms of creating shows or demonstrating complex astronomical events and concepts. It is always a lot of fun to see the excitement of the audience and the 'oohs' and 'ahhs' even when they just walk into our small planetarium with a digital image of our local horizon," explains Scott C. Jackson, Education Associate at the Mt. Cuba Observatory. Their 16-foot dome is powered by a digital Spitz SciDome system which opened in 2003-2004 and replaced an older Spitz optical-mechanical projector. Scott primarily uses the included interactive Starry Night software which he finds simple to operate. Starry Night is a comprehensive database with customizable high-resolution 360-degree panoramas of known satellites, comets, asteroids, meteor showers, and extra-solar planets. It is "more than sufficient" for Scott at present, but he adds that in future, "we may end up looking for or incorporating more 'canned' media into a presentation."
[See article by Bayley Silleck in this issue for more on fulldome systems.]

Digital 4D Specialty Cinema

The term 4D (even 5D and 6D) is essentially a marketing concept used to describe a customized cinematic experience (which may or may not be stereoscopic 3D) augmented by synchronized in-theater effects including bubbles, scents, wind, fog, mist, fans, lighting, additional screens, live actors, audioanimatronics, physical sets, moving seats and more.

In Atlanta, the Georgia Aquarium's 250-seat 4D theater uses a high-definition 3D playback system built by Electrosonic and custom special effects such as the feeling of tingling jellyfish tentacles brushing against your arms to present Deepo's Undersea 3D Wondershow, an animated musical with a message of conservation, designed by Gary Goddard Entertainment. The Revolutionary War Theater, highlight of "Discover the Real George Washington" at the new Donald W. Reynolds Education Center at George Washington's Mount Vernon Estate and Gardens (Mount Vernon, VA) uses state-of-the-art audiovisual presentation and effects including snow, fog and vibrating seats to evoke key battles of an historic conflict.

The most expensive of the three digital theater formats reviewed, a 4D venue tends to be somewhat smaller than their 3D counterparts if for no other reason than the cost of outfitting special effects in a custom theater is directly proportional to the number of seats. According to David Needham, Senior Vice President of Sales at SimEx-Iwerks, "$1,000,000 seems to be the basic price assuming 50 seats. However, the price can increase 50% depending on the special effects chosen." SimEx-Iwerks provides turnkey experiences such as SpongeBob SquarePants 4D, now running at the Adventure Aquarium in Camden, NJ and other venues.

Without question, 4D digital cinema has a "wow" factor and certainly ups the ante in terms of delivering museum content in a contemporary style.

The Business Behind the Show

Interestingly, almost no one interviewed had the same digital theater experience to share. It became clear that differences lay not in the technologies, but in the facilities themselves – staffing levels, funding, location, audience mix, mission and even physical size. That said, there are several important factors to consider before you make an investment in digital theater.

Despite the entertainment possibilities of fulldome, at present it is primarily viewed as an educational vehicle and as such is often paid for by government grants or school district foundations. Some vendors can assist by matching invoices to phased grants, but for the most part, financing is left up to the institutions themselves.

States Paul Tetu, sales and systems specialist for Sky-Skan, "Fulldome systems are typically sold in a fairly straightforward manner. System owners are not required to sign maintenance contracts or fulfill any minimum ticket price or attendance requirements, or license any particular shows. Sky-Skan encourages its clients to become active in producing their own shows, even distributing them if they are so inclined." According to Tetu, some 90% of fulldome operators license at least one show with their new system. "Revenue sharing does exist," says Tetu, "but is not used very often. In most cases, a straight license fee is paid, often for 50 years, but in some cases, 10, five, or even one year."
3D and 4D theaters are primarily the domain of larger-scale facilities that have additional funding sources including sponsorships, cash flow from door entry fees and private donors. At Mt. Vernon, the entire 4D project was paid for through private fundraising whereas at the US Space and Rocket Center, the 3D theater was financed through a mix of grants, fundraising and sponsorships. In some cases financing is also available from the vendor itself. For example, Panasonic Leasing has joined forces with ETI and can finance 100% of a project including equipment, design services, installations and furniture over terms ranging from 24 to 60 months.

Revenue models also vary considerably. Smaller educational centers such as the Williamsville Space Lab Planetarium charge students a nominal fee but this is often waived to ensure they can reach students from all backgrounds and continue to operate at their peak capacity of 20,000 students per year. Other venues sell single theater tickets or combo admissions. The U.S. Space and Rocket Center charges $20 for adult museum entry, $24.95 for a museum/movie combo or $8 for a 3D film by itself, whereas at Mt. Vernon, the theater is free with a $13 adult entry to the facility. When asked about her favorite digital success story, Roberta Perry of ETI cites the Aquarium of the Pacific. "They went to $3.00 per film or two for $5.00 and in 2007, the 3D theater captured 16% of their total attendance… of 1.3 million visitors."

Clearly, pure revenue generation wasn't the main driver for most when selecting a digital theater system. Instead, the focus was on reaching new audiences and engaging them in a fresh and innovative way, not to mention remaining competitive against other leisure activities including new home theater technologies. When viewed from this perspective, all of these installations have been extremely successful. Jon Elvert, director of the Irene W. Pennington Planetarium, a 60-foot dome at the Louisiana Art & Science Center, has experienced success firsthand since their new Sky-Skan installation in January. "We have had lots of PR… and an increase in attendance including [the emergence of] new customer segments as well."

The only cautionary word of advice was to be prepared for success. When asked what they would do differently if they had the chance, Mt. Vernon wished they had a larger queuing area to cope with their theater's extreme popularity. Soaring attendance is certainly a great problem to have! Roberta Perry of ETI is similarly upbeat about the digital future, "The stars are in alignment! The content, the technology and the price is right for every facility to have a digital theater to expand their educational and entertainment offerings."

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Opposite: An example of an E&S dome theater. Right: The Revolutionary War Theater, complete with 4D special effects. Previous: The Digistar 3 System from E&S. *Photos courtesy E&S and Donald W. Reynolds Education Center at George Washington's Mount Vernon Estate and Gardens*