Abstract. The fusion of art, music, lasers and conventional planetarium effects enjoyed a period of novelty and experimentation in the 1970’s and 80’s, but quickly waned in popularity in the 90’s as more complex forms of entertainment choreography hit the scene. The introduction of digital fulldome animation has provided a much wider palette to paint the dome sky with, and the Clark Planetarium in Salt Lake City has enjoyed a resurgence of popularity in “music entertainment” programs. Many more innovative styles and artistic interpretations are now possible, providing more than just “rock ‘n roll” experiences under the dome.

Beginings

The recognition of the dome as an artistic medium is nothing new. Producers recognized the potential of “music under the stars” soon after the modern projection planetarium made its debut in Germany in 1923. But the use of modern music in the planetarium theater went through a sensational explosion with the introduction of Laserium by Ivan Dryer in late 1973 at the Griffith Observatory in Los Angeles.[1] Experimental showings of “laser art” had already started up in the mid- to late-1960’s and was still enjoying a wave of novelty. I was among those that felt the unique mood-provoking effects of laser projection when Laserium opened at the Gates Planetarium in Denver in the mid 1970’s.

Because of its “newness,” lasers were the primary focus of the projection medium in its early years. It included a few basic planetarium effects, like stars, but not much else. Audiences were mesmerized by the distinctive nature of laser scanning imagery.[2] But attempts to take “laser shows” on the road and choreograph them onto flat screens were not as successful as using them on hemispherical screens. Being on a dome and sometimes combined with the “cosmic” environment is what made them truly unique. It allowed patrons to feel closer to the experience.
Variety Factor. It didn’t take long for in-house planetarium laser show producers to see the potential of the dome in creating wrap-around experiences that went beyond just lasers. Increasingly, lasers would be seen as just one of many powerful visual elements in the choreography arsenal. All-sky still imagery, panoramas, dissolve screens, flat screen video, star machine capabilities, and a wide variety of custom built lighting effects would be used to create a truly multi-dimensional experience.[3] This increased use of effects that utilized the entire domed screen kept audiences interested, for a while.

The diversity of effects, when skillfully performed, did much to keep the classic invention of the “laser show” alive well into the 90’s for a number of theaters. But for many others, the limited variety of projection effects and simplistic production values (when compared to the new media coming out) just wasn’t enough to keep audiences engaged. Attendance waned.

Then Something Happened

The full-dome full-color digital revolution provided a unique opportunity to re-interpret what it means to do a “music entertainment” show. Soon after the new Clark Planetarium opened in 2003 (replacing the historic 37-year Hansen Planetarium in a new location), patrons immediately started asking “What happened to the laser shows?!?” And with that we decided to try the experiment. How could we use fulldome digital animation to interpret various kinds of music? We knew that the potential of digital dome video was great but we needed to seriously rethink our methods of choreography and interpretation.

Our First Experiment. In the summer of 2003 we introduced our first music entertainment light show (we tried re-branding them as “Cosmic Light Shows” but the label never stuck). It was called “Cosmic Rock Hall of Fame” and featured a variety of classic rock music from the late 60’s through the early 90’s. The show was about 90% pre-rendered linear playback with the remaining 10% done in real-time but scripted.

With the support of local radio stations, attendance started out good (leveling out to about 70% capacity in our 205-seat theater). After six months ticket sales started to trail off but we still considered it successful and kept it in the schedule.
Bring Back the “Standby”! Just a few months later we re-introduced Pink Floyd’s classic album “Dark Side of the Moon.” It was perfect timing. The 30th anniversary of the album was celebrated with the commercial release of a 5.1 surround sound remix. We took full advantage of that in our advertising since the new theater had a custom tuned 13,000-watt surround sound system (one step away from being THX certified). The show utilized a number of traditional visual choreography methods but also a myriad of new styles that ranged from abstract art to all-dome photography to astronomical scenery to virtual environments. We also decided to try infusing a live-performance element by having the real-time effects run manually by a show presenter. It was again only about 10% of the show but it was a surprise discovery; by “working” the audience and making them aware of the live-performance component, they responded much more enthusiastically to what was going on the dome and started to come back for repeat performances. This had a significant effect on how we would plan future music shows.

Auxiliary Effects. As powerful as fulldome video is, we found there was still plenty of room for ancillary special effects to maintain an “unpredictable” nature to the shows.[3] Something “surprising and unexpected” is still a powerful attention getting device. While the popularity of spirographic abstracts and figurine-based laser effects may have gone by the wayside, we found that laser beam-work combined with theatrical haze and fog still gets a rise out of people. So we introduced three laser beam heads to the front of the theater – two NdYag (green) projectors at the “10 o’clock” and “2 o’clock” positions, and a full color RGB head at the front center (“12 o’clock”) point. Audiences gobbled it up and asked for more.

In time, we installed six “intelli-lights” into the projection gallery. They would also project from the front 35% of the theater, sweeping onto the dome, the audience, and even on the wall behind the perforated dome screen. People responded very well to these additions, and we made sure they knew that some of them were being performed live.

Going Beyond “Rock ‘n Roll”. In 2004 we decided to run our next experiment. “Entranced” would be a show to test several new concepts. First, it would represent the
Mike Murray

various dance club music styles, from techno to house, trance, and rave. When I mentioned this to other planetariums around the world, sometimes the response was “you actually have a market for that kind of music in Salt Lake City?” Absolutely! There are at least a dozen clubs that include those styles, and we made arrangements to advertise at several of them.

Second, we decided to let the live performance elements play a stronger role. More real-time joystick-controlled effects, more laser beam-work, more lighting effects.

The overall results in terms of audience response and repeat visitation was great. Attendance was strong for about six months, running on two weeknights as well as a single showing on Friday and Saturday nights. Response to the live elements was more noticeable.

Two years later we tried something different with that same genre of music to try and get strong attendance for a longer stretch. After updating the soundtrack, we grouped the songs into each major music type and had them run as their own block, 10 to 15 minutes long. There were four of these primary blocks, three of which would be strung together to make a show. So these blocks could be interchanged from show to show depending on audience preferences. The preferences would be made known to the presenter by interacting with the audience at the start of the show and in between each section. We re-titled the show as “Sounds of the Underground” and attendance held at a respectable level for nearly a year.

In the meantime, we thought about the Christmas season. “Holiday Music Magic” became a popular show because it wasn’t just a bunch of abstract effects and bouncing laser beams. We created a lot of thematic scenes, mostly CG in nature but also incorporating photographic elements. Even here, about 10% of the show has real-time effects performed live by the show presenter. The show is still a part of our December lineup after 4 years.

What’s Bringing People Back? Variety, both in music choices and live effects, is improving repeat visitation. More than just a few people have told us in surveys that they’ve seen a single show over 5 times. Those kinds of comments may not be common, but they’re not rare either.

In response, we decided to reinvent and re-title our classic rock show “Cosmic Rock Hall of Fame” into a new format. It’s now called “Rock on Demand.” We produced six new songs to add to the old mix, giving us about 80 minutes worth of music to choose from. Then we created a palette of real-time effects (now over 70) that could be called up by the show presenter and performed live with two joysticks and a “dials box.” But we also changed the way the audience would choose the songs. Rather than gauging their
feedback level (clapping, yelling, cheering!) we placed a little interactive “survey” on the dome which they would respond to using the responder buttons on their armrests. All the songs would come up one-by-one and they would vote on each. They had a choice of “two thumbs up” (++)，“one thumb up” (+), “one thumb down” (–), or “two thumbs down” (– –). At the end of the play list, the show presenter runs a program to tally the votes and they pick the top 12 for the show. Start with a reasonably strong choice to fire people up, then work from the bottom up, saving the most popular choice of the night for the encore. It’s been working beautifully ever since! It maintained a good attendance rate for over a year; now we just have to find the time to add more songs!

The other interesting note to this project is that we decided to increase the level of real-time CG live performance for the show. While we only had enough time, training, and effects to use for about 10% of our shows in the past, we now increased that to over 20% with “Rock on Demand.” The results were clear. We saw more repeat visitation because they not only knew the song selection would be different each time, but the live presentation element would make each song look and feel a little different too.

**The U2 Experience.** In 2007 we embarked on a new 9-month music entertainment show project. Focusing on the music of “U2” (which is very popular in Salt Lake) we made use of eight different producers to put their own special artistic imprints on the show. All but one were in-house producers. And several of those in-house were student part-time
talent (sometimes the most creative, mind-blowing content comes from them!). Each producer was assigned their own song(s), which means they were free to come up with their own special theme and choreography methods for that song. We held regular brainstorm and production meetings to cross-pollinate the creative juices and monitor quality control, but other than that people had a lot of creative freedom to interpret each song in their own way. This kind of variety, combined with the live performance features discussed before, has made for an extremely successful show. It opened in March of 2008 and continues to run record numbers as of the date of this presentation (July, 2008).

Lessons Learned

In the process of producing all these shows, running the experiments, and conducting the surveys, I can distill our “discoveries” down to the following:

**Ratios of Light and Dark.** One of the elements that worked so well in past “classic” planetarium light shows was maintaining a darkened environment. The same concept still holds. If too much of the dome is lit up with bright objects and scenes, it allows audiences to see everything in the theater – other people, seats, walls, or the cove edge of the dome. That tends to take people out of the scene and into a “theater.” It doesn’t feel as immersive or personal. So we learned to keep a majority of our scenes from getting too bright; providing contrast and more “black” components to the overall scene.

**Color saturation.** This is another important element to notice in production because it keeps the dome from washing out in too much bright light. But it can also make scenes feel more vibrant. Making colors deeper and darker not only helps avoid the “retinal overload” factor, but can help many scenes feel more emotive and surrealistic.

**Motions.** Camera movement can be critical, even in music light shows. At the beginning, we thought people would love to be “spun around” just like we used to do with star machines and monochromatic wireframe graphics. But in fulldome video, you have so much more “object” and “texture” on the screen and thus people are trying to take in the complex detail. If you move those brighter and more complex images too fast, it’s too hard for them to keep up and the images lose their impact. They look for an external reference frame, like the edge of the dome, to get their bearings. Moving too fast also stretches what 30 frames per second can smoothly recreate. It’s film production 101 – panning beyond a certain speed will cause the “jumping and jittering” effect on the dome as the frame rate is too slow to maintain smoothness in the playback.

**Quality Sound.** If people are coming to get a music and visual experience, then shouldn’t the attention to sound be just as serious as the imagery? It’s not about playing
the music louder, it needs to have excellent dynamic range, clarity, presence and balance so the audio feels every bit as powerful as the video.[4] We invested in a quality, custom-tuned surround sound system but also devote a significant amount of time on finessing the soundtrack itself to match the acoustical environment of the dome. Trust me, audiences notice.

**Variety of Interpretation.** Not every song needs to be interpreted the same way. Using the same method of choreography from song to song makes things predictable, and that spells death in keeping your audiences engaged. There are many different features to the music that can be followed and focused on – lyrics, percussion, guitar lines, etc. Fulldome art and animation gives us a much more complex way to follow those features than laser graphics and still images could do. Because of that, for example, you don’t have to resort to interpreting lyrics in overly-literal and cartoony fashions. They can be more symbolic, abstract, and metaphorical.

**Video DJ approach.** Simply having someone read a few “rules and regulations” and hitting a start button isn’t going to make audiences feel very warmed up to the experience. They need to be prepared! It’s good to put a little showmanship into the announcements, but it needs to be genuine, polished and professional. You need to connect with your audiences, and use a variety of ways to do that depending on the responses you get. We make comments or ask questions in between almost every song, to keep them fired up and involved. Ask them what they want more of, if they want the volume turned up or down, if they’re having a good time; offer a historical anecdote, make a joke. It feels more unique this way, like a “digital concert experience” as opposed to a “music video.”

**Live Performance Elements.** In association with the live video DJ approach, there is also the live real-time performance component. When people are told that some of the images on the dome will be performed live, they’re inspired to look for them and respond. They know something will change from performance to performance, and that goes a long way to bring them back for future shows.

**What Next?**

We’re looking to try different genres of music, even live music. One idea is a program called the “Zen Hour.” Run a 45-minute show over the lunch hour with relaxation, environmental, and meditative music. Images on the dome could cover a wide variety of subjects, from floating through a 3-dimensional starfield to earth scenery to mood provoking abstract art. The idea has already been a hit at the Ott Planetarium at Weber State College in Ogden, Utah.
Conclusion

The quantum leap of applying digital animation to domed theaters can re-awaken the value and attractiveness of music, art and even science in planetariums. But it comes from the combined efforts of skilled and creative animation, quality sound, well trained show presenters, and an effective advertising effort. Everything you can do to capitalize on the “uniqueness” of the experience will set you apart from any other entertainment or artistic medium.

The live human element, the personal connection – that can be a big part of what brings patrons back. But it’s also the variety of presentation techniques, the improvisational elements in the show (provided they are well performed), or the “jukebox” selection approach.

The bottom line is to keep the experiment going and don’t be afraid to try new things, but do everything you can to learn about what your audiences want!

References


