

Post
Production
Key moments
in CG history
revisited



Projected onto a dome, full-dome films immerse the viewer in an environment with resolutions that rival large-format films

Debrief
Studios look back on the highs and lows of recent commercial jobs

Inner space

Matthew Mascheri, Jason Heaton and Michael Narlock share the story of how they created the immersive SpacePark360

About the authors



Matthew Mascheri is the founder and president of Dome3D, a production company near

Chicago that develops cutting-edge immersive content, offers turn-key portable dome systems and provides full-dome production training and support www.dome3d.com



Michael Narlock is an accomplished museum professional and astronomer. At Dome3D, he

specializes in compositing, 2.5D and 3D animation, VFX and 3D modelling www.dome3d.com



Jason Heaton has worked in astronomy as an educator and VFX artist for a

planetarium for almost two decades. He works with Dome3D as a 3D artist and photographer www.dome3d.com

VITAL STATISTICS

Studio: Dome3D
Format: 4Kx4K domemasters
Client: Full-dome theatres
Time taken: Approximately two years
Team size: Three principal producers, two composers
Software used: 3ds Max, Creative Suite, ZBrush
Release date: SpacePark 360: 2010, SpacePark360: Infinity: 2013

The full-dome medium is primarily used by digital planetariums. Projected onto a domed surface, full-dome experiences immerse the viewer in a 360-degree environment whose native resolutions rival those of large-format films. Many full-dome films are educational in nature, but we sought to up-end the convention by developing an entertainment-based experience.

The creative process behind a modern planetarium experience isn't that different from the processes used to develop television shows or movies. There's a writing phase, pre-production, production, post-production, marketing, sales, distribution and more. In 2008, Dome3D began the creative journey that resulted in SpacePark360, a modular experience that fuses space themes, unique music and the excitement of amusement park thrill rides.

There were many facets to the development of SpacePark360 that set it apart from anything traditional. Perhaps the biggest hurdle was the fact that we lived in different areas of the United States. Distance aside,

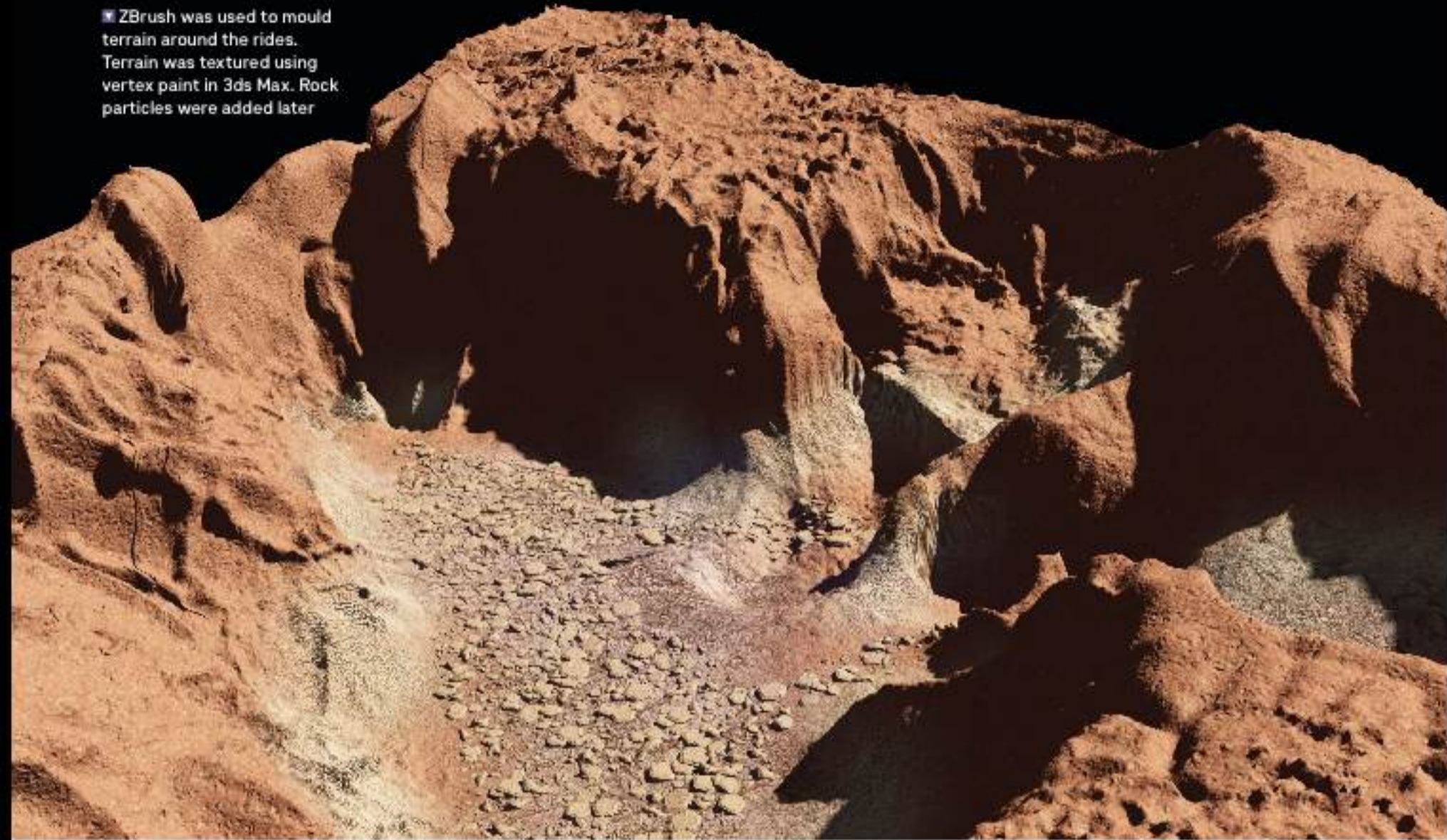
we were faced with challenging issues that needed to be resolved, including technical glitches, and the fact that we had virtually no start-up capital and were working without a physical location. At its core, this was a leap of faith. It was speculative at best, foolhardy at worst. Ultimately, though, the show has proven to be a success in the United States and abroad.

What we did right

1. We had a clear vision

We knew our target demographic well, and spent ample time in pre-production, so we were able to design a marketable brand identity, leverage social media outlets, and develop a promotional website. The relationships with potential clients that were developed during pre-production helped to create the positive cash flow necessary to launch into full production. To help keep costs down, we created a virtual office using online tools such as Google Docs and Skype, and used LogMeIn to share screens. We also used YouTube and Vimeo extensively to

▼ ZBrush was used to mould terrain around the rides. Terrain was textured using vertex paint in 3ds Max. Rock particles were added later



post private test animations for review and to show to potential clients.

2. We created a modular product

Unlike typical planetarium productions, SpacePark360 was designed as a modular show, divided up into nine parts, each featuring a particular ride and environment. This afforded theatres the option to purchase individual rides, a set of rides, or the full nine-ride experience. Additionally, theatres could purchase the individual rides as they were completed, before the entire show was finished, which helped to generate revenue.

Modularity also afforded us the opportunity to add on to the existing show in the future, which we're currently doing with SpacePark360: Infinity, due for release later this year. Infinity will feature nine new rides that will not only serve as a sequel, but can also be used to complement the original show. Theatres around the world will be able to mix and match 18 rides – roughly 90 minutes of material – into a show that fits their particular needs.

3. We welcomed collaboration

Another unique aspect of SpacePark360 was the fact that we collaborated with multiple artists to create soundtrack options. We first worked with veteran composer Mark Petersen, and his Geodesium brand, who's well known in the planetarium community for his deep and rich space music.

After SpacePark360 was complete, the Tellus Science Museum in Georgia reached out to artist Maggie Smith and producer Will

▼ Full-dome sequences are rendered at 30fps with resolutions up to 4,096x4,096 pixels. Care was taken to ensure that the motion looked great, not only on a desktop, but at full resolution in a dome



► Original scores were created for the show, including one featuring rock artist Maggie Smith

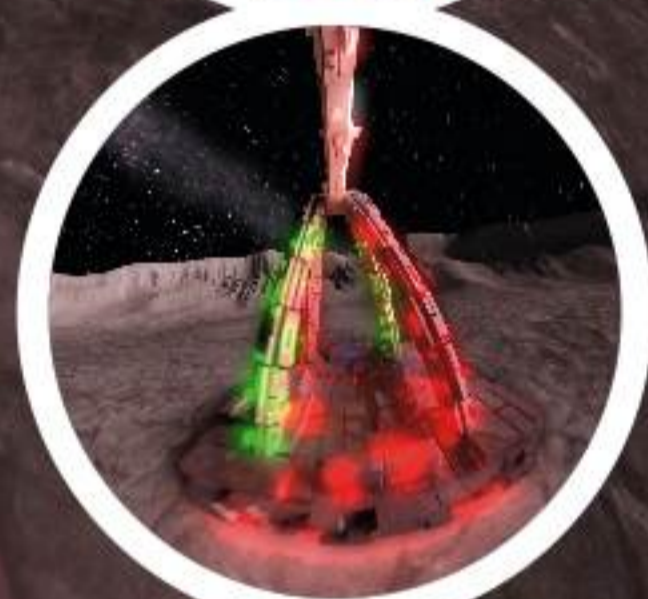
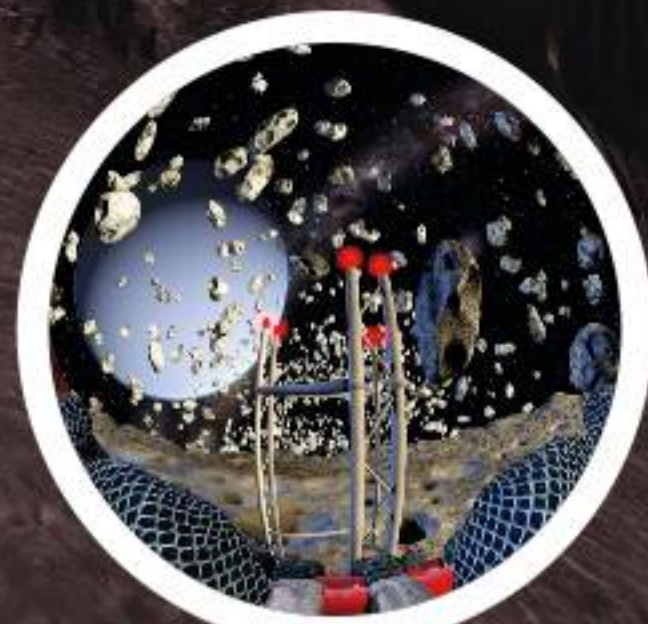
Wheeler to have custom music created. Their alternative rock score was later provided as a second soundtrack option.

What went wrong

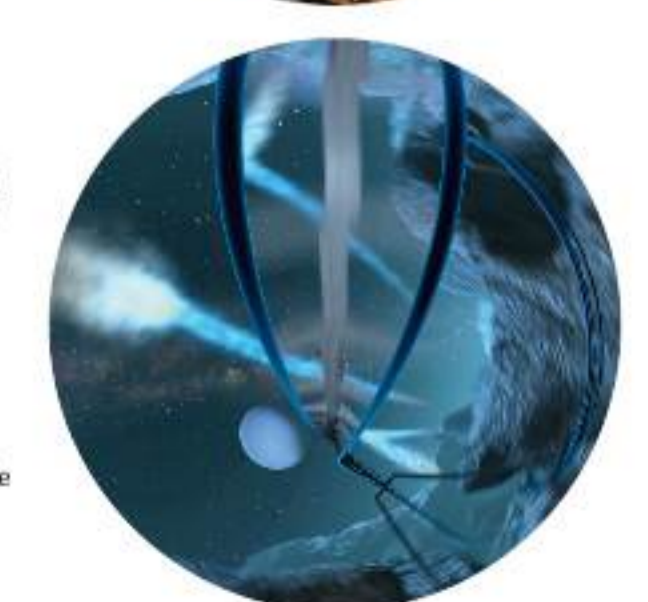
1. Rendering was a challenge

The single largest challenge to creating an immersive dome experience is the amount of time it can take to render the content. The final product is typically a 30-40 minute show rendered at 30fps with individual frames that can be up to 4,096x4,096 pixels. Even after scene optimisation, a three-minute ride with proper motion blur and global illumination could take weeks or months to render. »

Creating the show in separate modules enabled the team to generate excitement before it was complete. Here, a ride is set in the rings of a gas giant



SpacePark360 features nine rides, each set in a different location in the Solar System. Here, a thrill ride is set on a floating platform in the upper atmosphere of Jupiter's clouds



2. Playback standards can be difficult

Currently there are dozens of ways to slice, encode and project full-dome content. Slicing and encoding are industry terms for how to break complete domemasters (the individual frames of an animation) into chunks of information that a multiple-projector system can play. The lack of playback standards coupled with numerous projection systems makes streamlined distribution of full-dome content costly in both time and resources.

Lessons learnt

The lessons we learnt on SpacePark360 have aided us immeasurably as we work on its sequel, SpacePark360: Infinity. Even though there were a number of production issues, none was more important than ensuring that the final product looked and felt right when projected onto a dome. If the motion wasn't right, the exhilaration of the ride would be lost. If the environments weren't engaging, the intensity of the ride would be diminished. Everything had to work together, to be balanced, or the net effect would be the opposite of entertainment.

We also learnt not to be afraid to leave our comfort zone. Although we created this show with planetariums and immersive theatres in mind, we believe that the idea behind the show may be welcome in other formats and markets. Indeed, for SpacePark360: Infinity we've set a few of the rides in environments that might be accessible in other formats, such as a 4D simulator. For the sequel, we're also making sure that every aspect of production goes through each of our hands: each ride and terrain goes through an extensive review and analysis phase. The end result will be a ride experience that's greater than the sum of its parts.

SpacePark360 was a project that involved three friends working together to overcome various problems in order to create a show that featured roller coasters in space. If that sounds like it was a lot of fun, it was. But for us, nothing is more rewarding than hearing about the success of our show from the people running it – such as a message we received from Mike Smail of Louisiana Art & Science Museum: "130-plus kids are screaming in my planetarium, and it's all your fault!" ■