DAILY PLANET

NORTH CAROLINA, USA
THE AMERICAS

Already one of the largest facilities of its kind, Raleigh, North Carolina's Museum of Natural Sciences recently completed work on an impressive new addition: the 80,000 sq ft Nature Research Center. Featuring state-of-the-art laboratories, research opportunities, and numerous interactive exhibits, the Nature Research Center acts as a global hub, connecting researchers and the public worldwide to address and raise consciousness on environmental issues on a global scale.

The crown jewel of the new NRC wing is surely the SECU Daily Planet, an intensely immersive, three-story multimedia space that engages visitors with a larger-than-life flurry of sight and sound, while offering a powerful message about the wonders of science in our daily lives.

On the streets outside the museum, the Daily Planet's massive three-story high Planet Earth globe has created a new and striking landmark in Raleigh's downtown. The inside of the globe is home to an immense, spherically shaped auditorium with two balcony levels

extending seven feet into its centre. The three-level design allows guests to choose from three unique vantage points as they take in any of up to 50 powerful presentations that run throughout the day. The Daily Planet's 40ft high, high-definition curved screen runs continuously, projecting a variety of stunningly powerful visual and informational content created by New York-based Batwin + Robin Productions. A small stage at ground level also allows for live presentations.

Not surprisingly, delivering content to a 40ft high curved environment requires a fair amount of leading-edge technology. Delta media servers from West Sussex, UK-based 7thSense Design handle playout to a complex matrix of six Christie WU12K-M projectors delivering a non-standard, uncompressed 3366 x 2964 media display with real-time image blending and screen warp to conform to the curved projection surface. Any projector can send to any point, but to project a full image over the entire screen, the projectors configure a two column grid extending three rows high. A Medialon GD-SCMPRO

Show Control Machine provides a user interface and keeps all the elements in sync. The lighting system is triggered by the Medialon system to match the program material's requirements.

A secondary Delta server feeds an additional playout timeline into the live inputs of the main Delta unit, syncing content to ensure smooth and continuous transitioning between timelines. Miami-based show-control programmers Smart Monkeys played a critical role in developing the GUI for the system, which provides operators a choice of different scenarios of pre-recorded content, live presentation windows, and graphic backgrounds, enabling them to select between playback and interactive presentation.

"Smart Monkeys and 7thSense worked closely over an intense four-week period to create the show's programming," explained Gary Barnes, Project Manager of AV integrators Electrosonic. In addition to six channels of HD video, the Delta servers provide timeline synced control of lighting and playout, as well as 16 channels of high-resolution audio.

The combination of ellipsoidal walls and three levels of vantage points made delivering impactful and immersive audio consistently across the venue a unique challenge in itself. Electrosonic teamed with Milford, CT-based SH Acoustics to create a multi-level, multi-environment system utilising Renkus-Heinz Iconyx digitally steerable column arrays.

"Unlike similar spaces - for example, an Omnimax Theater - the Daily Planet needed to accommodate a variety of different formats, including lectures and live performances," explained Steve Haas, Founder ▶
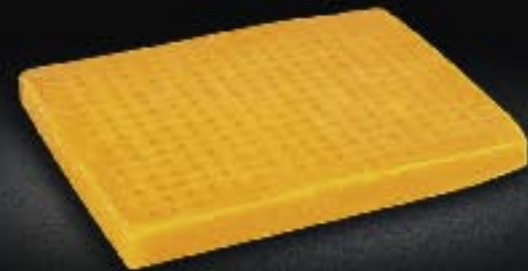
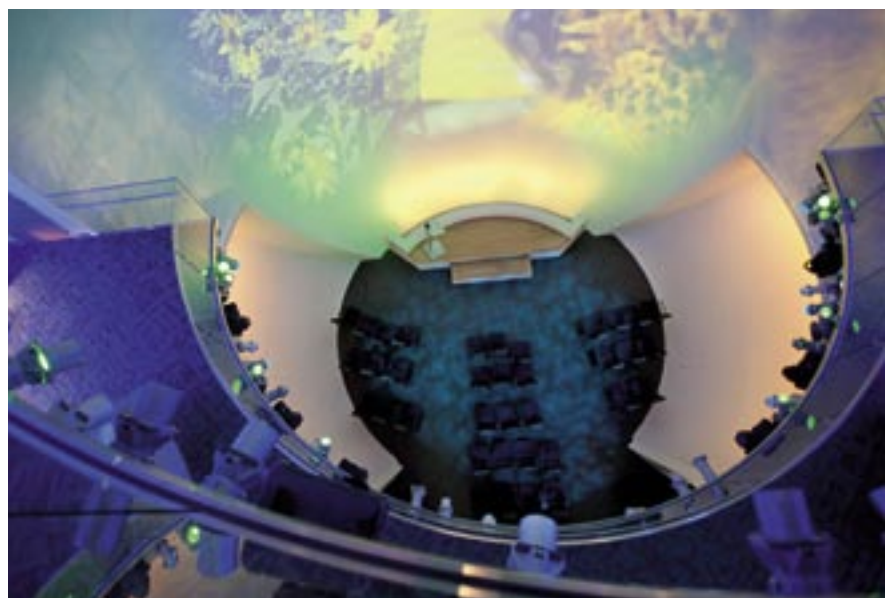and President of SH Acoustics. "The room's unique design and its numerous reflective elements created some interesting challenges right from the beginning. We knew we couldn't simply apply tons of sound-absorptive materials because deadening the room too much wouldn't work well for lectures."

Employing the Renkus-Heinz Iconyx steerable beam technology enabled them to more effectively direct the speakers' output to avoid unwanted reflections, while at the same time addressing the unique acoustic requirements at all three levels, Haas explained.

"We decided very early that we wanted to create three different audio experiences on each of the three levels," he added. "Most importantly, each area needed to have its own unique sonic imaging. We needed to make sure that we had a very tight pattern - at least vertically - so that the experiences at each level did not interact with each other in any appreciable way. This is where the digitally steered beam technology was a no-brainer."

The loudspeaker complement includes left, centre, and right Renkus-Heinz Iconyx IC8-R-II arrays on the ground level and on the first balcony. Both levels also include four Renkus-Heinz SG61-2R powered two-way systems for surround, The upper level is outfitted with a left-right pair of Renkus-Heinz IC8-R-II columns, augmented by a pair of Renkus-Heinz SG61-2R surrounds. Haas explained: "On the third level the dome is much tighter, and that prevented us from achieving the spatial depth we wanted, so we opted for just left and right with two surrounds."

Three Renkus-Heinz PN112SUB 12-inch powered subwoofers provide low frequency power. "For low frequencies, we placed all three subwoofers on the second level," said Haas. "There simply wasn't enough room for discreet subs on each level, so we configured each one as the point sources for the adjacent levels, and delayed the LF signal appropriately from the first level, second level and third level. It actually worked quite well."

The 7thSense Delta servers provide the audio, in sync with the video programming, with each of the two Delta units outputting 16 channels of audio via CobraNet to a Richmond Sound Designs ▶

"Unlike similar spaces – for example, an Omnimax Theater – the Daily Planet needed to accommodate a variety of different formats, including lectures and live performances."

SoundMan HLX-4300 AudioBox 32-channel server. The SoundMan unit performs the matrix mixing between the dual 16-channel sources, conforming it to a single 16-channel output that is then sent via Co-braNet to a MediaMatrix NION n3 DSP unit. "The SoundMan server also hosts a number of wild tracks - uncompressed .wav files - that can also be fed into the mix engine," explained Electrosonic Project Engineer Carl Hartzler. "The outputs from the MediaMatrix unit are then routed directly, as analogue signals, to each of the Iconyx units." Delay, EQ, and other DSP is applied by the MediaMatrix unit. As Hartzler pointed out, the audio mixes are not technically true 5.1 surround, but rather more program-dependent in nature. "There are typi-

cally more channels than a standard 5.1 surround mix," he observed. "The material and the user experience dictate the actual mix. There's also a different signal sent to each sub, based on its location."
As Haas pointed out, the Renkus-Heinz Iconyx system's beam steering capabilities enabled them to dial in the perfect output at the ground floor and both balconies. "We were able to get the second and third levels sounding fantastic with very little difficulty," he said. "The first level was a bit more challenging, but the Iconyx beam steering, combined, with the careful addition of diffusion materials, made all the difference."
After the system was configured, Haas worked with the museum ▶

production staff to save a number of unique output presets that could be easily retrieved to accommodate different program types.

"There are several different modes including a presentation mode and a media mode," said Haas. "We even gave the producers the opportunity to have a secondary beam from some of the upper arrays - like from the second level down to the first level - in case they wanted a spot effect or some other secondary sound source."

Needless to say, the complexities of designing this intricate web of sound and visuals called for a true team effort of the highest order. Both the technologies and the designers implementing them worked together to realise a vision that was truly greater than the sum of its parts.

"Hats off in particular to 7thSense Design and Smart Monkeys," said Electrosonic's Hartzler. "They really worked together to create an amazing system with an equally amazing user interface. And of course, Batwin + Robin's concepts formed a foundation that make the Daily Planet, and the entire facility, far more than just another museum exhibit."

Haas also pointed to the working relationship between SH Acoustics and Electrosonics as instrumental in addressing the project's sonic challenges. "This is a great example of combining great technology, real-world know how and creative, talented partners to overcome seemingly impossible technological challenges. We love these kind of challenges, and we have a very long history of working successfully with Electrosonic and Renkus-Heinz on unique projects like this."

Electrosonic's Gary Barnes summed it up: "Between us we have created a unique experience which combines the best of immersive multi-image technology with the freshness of a live and spontaneous theatre show. Seeing is believing!" ▥

TECHNICAL INFORMATION

LIGHTING & VISUAL
3-metre long M2256PW 22-inch multitouch LCD display; 7th Sense Design Delta media server; Adtec Digital EDJE4111HD MPEG2 HD player; Christie Roadster WU12K-M HD projectors; Christie DHD800 HD projectors; High End Systems DL3/F digital lights; High End Systems Axon Video graphics software; High End Systems DL3 throw distance chart; Medialon Rugboard PC; Medialon MIP-HD media player; Medialon GD-SCMPRO show control machine; Medialon Manager V6 show control software; projectiondesign F22 1080P video projectors; projectiondesign F12 WUXGA video projectors; projectiondesign F12 1080P video projectors; projectiondesign FR12 1080P remote light source projectors; projectiondesign WB2560 video signal processors; projectiondesign WB1920 video signal processors

SOUND
Innovox Audio ML8-USB mini line arrays; Innovox Audio SL-1.1 US ultra slim loudspeakers; Innovox Audio SBC-110 ceiling mount subwoofers; Innovox Audio FS-H2 display mounted speakers; Innovox Audio LTS-1 ultra slim loudspeakers; JBL Professional Control 25AV2-way speakers; JBL Professional Control 24C MICRO compact ceiling speakers; JBL Professional Control 19CS ceiling loudspeakers; Klipsch G-12 2-way speakers; QSC Audio CX168 amplifiers; QSC Audio CX502 amplifiers; Renkus-Heinz SG61-2 2-way powered speakers; Renkus-Heinz IC8-R line arrays; Renkus-Heinz PN112-SUB self powered subwoofers; MediaMatrix NION n3 audio digital signal processors; Sennheiser EW300 G3 wireless microphones

www.naturalsciences.org/nature-research-center/daily-planet