First Full Dome Digital Planetarium in Jordan

By David Binnewies
Chief Engineer

Last February 2014, I helped oversee the completion of the first full dome digital planetarium of Jordan, located in the heart of a modern business district in the nation's capital Amman. The planetarium was part of a major renovation in 2014 of the Haya Cultural Centre, which was originally Inaugurated in 1976 by the late King Hussein and Queen Alia and named after their daughter Princess Haya. The Princess currently chairs the Centre's board of trustees. The newly constructed theater has a 10.5 meter TecnoDome and Digitarium Kappa full dome video projection system.

Bowen was brought in early in the project to provide expertise for designing and building the theater, as well as providing the entire equipment package, including cove lighting and the control system. Bowen worked with the local Jordanian company AVS (Advanced Solutions) and was first brought in during the design stage to provide expertise to the local design firm DAR (Design Associates & Research Bureau) that was in charge of the full design of the entire center. Then at the execution stage, BT was also contracted with AVS for the final designing, building and equip-

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A Special Event @ Computer History Museum: A Revolution

By Jeff Bowen, Owner

Bowen Technovation is pleased to serve as a sponsor of an exciting Evening Event at the Computer History Museum (www.computer-history.org/) on Tuesday, October 27 during the Annual Meeting of the Western Museums Association (http://www.westmuse.org/annual-meeting).

From WMA Executive Director Jason Jones, “A Night in Nerd-vana: The Computer History Museum”

“Get your geek on at the Computer History Museum, home to the world’s largest collection of computer-related artifacts and archives. Explore Revolution and discover why computing history is more than 2,000 years old. Let a telepresence robot take you on a virtual tour. Experience demonstrations of the 4-ton Babbage Difference Engine No. 2, play Space-war! (JB Note: considered to be the first digital video game) on a restored DEC PDP-1, and learn just how noisy a fully operational IBM 1401 mainframe system can be. See why Silicon Valley is the powerhouse of technology and how computers have changed the way we work, play and live. Pocket protector not required.”

Housed in the large building that once served as the international headquarters of Silicon Graphics (SGI), The Bowen team’s work in the 25,000 square foot exhibit areas at CHM includes over 90 electronic linear and interactive systems all networked via one master control system with fully automated turn-on/turn-off via time and date schedule. Docent overrides are provided in several spaces to switch the systems to a live presentation mode.

Design was performed by Van Sickle & Rolleri with fabrication by Exhibit Concepts (a co-sponsor of the evening event). Trust me…you will want to prioritize a good chunk of time because there is phenomenal amount of things to experience. Jeff Bowen, Mark Trotter, Brian Norris and Diana Bowen will greet you as you arrive and will wander the galleries to answer any questions you might have.

And bring your appetite…eats are provided!
Report from Exhibit Expo
By Jason Umbreit
Fabrication Manager

Last October Bowen Technovation hosted an exhibit and immersive theater design conference here in Indianapolis. This Expo consisted for workshops, tutorials, product and software demonstrations, and a wonderful opportunity to interact with our clients from museums, immersive theaters, exhibit design firms, and from all over. More than 30 major manufacturers participated from all across the US.

These engineering representatives, as well as our own BT Staff held a series of informative workshops and tutorial sessions for both days. It was a rare and extremely informative opportunity to get all the insights and advice from the experts of these particular topics. These sessions were each followed by question and answers sessions which were just as informative as the workshops themselves. It was great to meet all the exhibitors and attendees.

No worries! Our website, www.bowentechnovation.com has both days of highly informative workshop sessions available to watch anytime. Just click on the link at the bottom of our main page, then select the workshop you would like to view. It is just that easy.

Editors Note: Many manufacturers and attendees have contacted us to tell us they plan to attend our Expo 2015 this year. We won’t have one this year so watching those web videos will be a good alternative.

Some quotes from participants:

“It’s always great to hear from end users about the challenges they face, so we as manufacturers can develop products that fit their needs. It was great to have an opportunity to educate so many people about the technologies that their facilities rely on.” Eric Cantrell -Medialon

“The Bowen Technovation expo was filled with great technology to explore and a ton of useful information. The same attention to detail, and pride in workmanship that we see in the company’s installations and inventions was definitely present in this expo. It’s a lot of fun as a manufacturer’s representative to work with a company that is constantly on the cutting edge and pushing the boundaries of multimedia production installation. Gary Mielke-Sennheiser, Presonus, QSC.

“The Bowen Expo is a wonderful opportunity to meet with your customers to completely understand their needs to better provide the proper solutions for their project. We are proud to team with Bowen Technovation as an integration partner who goes above and beyond to provide full support to their customers from concept to completion.” Ken Voss, Manager Installed Sound, RCF USA

“Bob White Associates has had the pleasure of working with the consummate professionals at Bowen Technovation for over twenty five years. The BT Exhibit & Immersive Theater Expo 2014 attests to the attention to detail that are intertwined in every project they pursue! Thank you.” Tod White

“The Bowen Technovation Expo was a great opportunity for us to touch clients in the field with our newest technology. The fun draw for the show was an opportunity for us at Williams Sound to dialog with local professionals about the ADA changes that have affected any public venue with an audio system, in recent years. There are many grey areas open to interpretation as to what exactly those changes include for pro AV professionals and public venues with display / exhibit spaces. Our seminar on the ADA for assisted listening, brought clarity and a much needed discussion to light for all involved…. Thanks Jeff Bowen!” Tony Strong-ADA Workshop, Williams Sound
Solid State Projectors. No lamps? New lower prices?

By Mark Trotter, Senior Project Manager

For decades, video projection technology has evolved from the CRT to the LCD, LCoS and DLP based projectors. Projector resolutions and brightness have increased over the years as well with some of the brightest projectors reaching 40,000 lumens and others reaching 4K pixel resolution. In addition to resolution and brightness increase of recent years, there has also been development in the area of illumination. The lamps that traditionally have been used were either UHP (Ultra High Pressure) or Xenon arc lamps. These types of lamps produced a bright light in a broad spectrum of colors that would allow the accurate reproduction of colors used in video.

One of the attributes of these types of lamps is the fall off of brightness over time, so a projector that might output 2,000 lumens with a new lamp might only put out half that brightness after 1000 hours of use. Another attribute is that the lamps would typically have useable total operating hours of 1000 to 2000 hours. After that time and new lamp would have to be installed at a cost of $700 to thousands of dollars.

Years of research have gone into developing better solutions to the issue of lamp longevity and light output reduction. Within the last few years with the advent of brighter LED technology, the opportunity to produce a projector with a much longer lifespan and more consistent light output over that lifespan became a reality. These new solid state LED based projectors were a break-through that was welcome, but at a price. The light output of a typical LED projector was about a quarter of a traditional projector. For some, the low operating cost and low maintenance was worth the trade-off in brightness; however most users desired more light output.

Recently a development in the solid state projection technology has combined LEDs and LASER into LASER /LED Hybrid projectors.

Combining the benefits of both higher efficiency and higher brightness, LASER /LED Hybrid projectors use LEDs for Red and Blue, but generate Green using a LASER shining through a phosphor. Other designs use a blue LASER on a phosphor wheel to produce yellow light which is then split into green and red. These higher brightness LASER /LED Hybrid projectors have several advantages over traditional technologies such as…

- Light module lifespan of 20,000 hours
- Stable light output level
- High Contrast ratios of 20,000:1
- 24/7 Operation
- Lower operating costs
- Quick Start / Quick Off
- Lower energy usage
- Low heat and noise
- Excellent color reproduction

These features are highly desirable for most users especially for museums and special venues where access to the projector might be limited and the projectors are expected to operate 24/7.

These new technologies have allowed the use of image projection in areas not previously practical and at a low maintenance cost.

Editors Note: You can see 40 minute detailed video workshop on this subject conducted by Digital Projection engineers at http://bowentechnovation.com/expo2014/. Just click on ‘W-3 • “New Projector Technologies” Part 1 • Part 2.
NEW TOYS: Part II
By Brian Norris
Project Manager

I’m always on the lookout for new technology and there’s plenty of it out there! I would like to share a few items that have caught my eye:

Planar Transparent OLED

Although this technology is in the prototype stage – it’s worth keeping an eye on it. Transparent displays allow users to view what is shown on a glass video screen while still being able to see through it, enabling them, for example, to overlay digital images onto real objects that sit behind glass. OLED displays are self-emitting, eliminating the need for a backlight or enclosure.

Transparent OLED is ideal for a broad range of applications including museums and science center settings. They can be used to encourage patrons to interact with exhibits by displaying artifacts overlaid with text, images or video content designed to educate and inspire. These displays can be touch-enabled as well.

Transparent OLED offers brilliant picture quality, exceptional contrast and wide viewing angle. Because the OLEDs themselves emit light, viewing angles are very broad and color performance is exceptional, leading to vivid, eye-catching installations. Moreover, because only those pixels that display content are turned on, a transparent OLED showing video will exhibit better contrast and energy efficiency than traditional displays. Planar expects to offer these displays in early 2016.

RDL D-SP1A 2 Watt Decora-Style Loudspeaker

It has always been a challenge to find a very small, discrete speaker that can be easily hidden within a museum exhibit. The RDL D-SP1A fits the bill. This speaker is a compact 2 watt, 8 ohm loudspeaker that delivers rich, detailed sound in Decora-compatible wall or chassis mounts. Dispersion covers a spherical area of nearly 180 degrees. These units are constructed of steel and are available in black, white, grey or stainless steel.

Middle Atlantic Products L5 Series Lecterns
Mobile Exhibits /Distance Learning...

The L5 series of lecterns combine the strength and functionality of an equipment rack with the look of furniture. The robust steel frame ships from stock so rack components can be installed and wired ahead of time while the finish panels ship separately. The options on these lecterns are seemingly endless. You can choose from three different widths and several styles that will blend with any design aesthetics.

There are currently sixty-five finish styles and colors to choose from ranging from thermo laminate to veneer.

Depending on lectern width - a storage drawer, document camera drawer and pullout keyboard shelf are included. A minimum of 12 rack spaces are included in each lectern. A Power strip, internal cable management, thermal fans and casters are included.

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Work Outside of Work

By Matt Rosenfeld
Systems Specialist

As hard as we work at our jobs here at Bowen Technovation, I am still able to keep busy outside of work. If you read my bio on the Bowen website, it says that I am involved with the Boy Scouts as a leader. I tend to keep pretty busy outside of work with volunteering my time to help develop young leaders through the Boy Scouts, as I, myself am an Eagle Scout, however my true passion lies in my annual trips I take to Jamaica. This is a little highlight of the trips I take there.

Every December, since 2004 I have gone to St. John Bosco Boys Home in Mandeville, Jamaica. Bosco is a home that helps about 150 disadvantaged, delinquent, abused, and orphaned boys. I started my trips when I was going to school at Wright State University by going with a student group to help prepare and get the boys excited for Christmas. In 2006, I began my solo trips there and have been spending my Christmas holiday there ever since. During the trips I take there for Christmas, which are usually for two weeks, I help the boys and the Sisters of Mercy, who run the place, get ready for Christmas. Bosco helps to teach the boys a trade, so that when they turn 18, they can go out and get a job. They can learn to raise pigs and chickens on the farm that is on the property. If the boys want to work at a restaurant or on a cruise ship one day, they also are given the opportunity to learn how to cook and serve food and behave properly around guests. Sometimes they get to practice on me, since I am the guest. Around Christmas time, because these different trades operate like a business, it can get very hectic and busy, so I do what I can to help out.

Once the nuns, who run the place, found out that I have a technical background, they wanted to utilize my skills. Over the years, I have installed a few sound systems for them. The first one was in their catering hall. It’s a hall they rent out to the public for parties and receptions. They are now able to play music and make announcements. I also have installed a sound system in the boys’ dormitories. They use this as a music therapy tool. When it is time for sleep at night, they play relaxing, soothing music to help clear the boys’ minds to get them to have quality sleep. One other system I put in was a PA system for their school. Now the teachers and principal can address the students each morning. I also check and maintain these systems every year I am down there.

One of the most rewarding things about my annual trips there is the long-term impact I have had in the boys’ lives. I still keep in touch with some of the boys who I met during my first trip and those I have met along the way. They have grown up and moved on with their lives, but still keep in contact with me pretty regularly. Even within the last few weeks, some of the past boys, who I long forgot about or never really knew, have gotten in touch with me to thank me for the work I have done down there and told me about the impact I have had on their lives. I still keep in touch with the first boy I ever met down there. When I first started going in 2004, I never thought I would go there beyond my time at Wright State, and here it is, 11 years later, and I am continuing to make a difference in the lives of the people down there.

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“NEW TOYS: Part II” continued from page 5...

A standard connectivity panel with HDMI, CAT6, 3.5mm stereo mini jack, VGA can be added or you can customize your own. Other options available are goosenecks light with dimmer, monitor mounting, tablet mounting, microphone holder, clock timer or custom logo. You can also customize your presenter panel to include a small touch screen or control surface.

Bowen Technovation
Decora Style Rack Light

What happens when you can’t find exactly what you are looking for on the market?

You design and manufacture exactly what you need! That is exactly what James Carlson, BT Design Engineer – Rack Light Division, decided to do. We wanted the rack light to fit within a standard Decora Style opening as to maximize valuable rack space.

The other challenge was to have the ability to switch between Red LED lights, which are more conducive to the light sensitive environment of an immersive theater and a standard White LED light.

A custom manufactured metal insert with easy to read labeling rounds out this simple but effective BT accessory. These are surprisingly useful and are included in all AstroFXAudio systems.

“Work Outside Work” continued from page 6...

Editor’s Note:
At BT we strongly encourage volunteer participation in world-wide and local environmental, animal treatment, community and worldwide health, education and not for profit programs. As a company and as individuals we support many such efforts and encourage you to do so.

Magic Planet® Powered by The Elumenati Comes to BT

Some of you might recall that The Elumenati demoed their Magic Planet at our 2014 Exhibit Expo in Indianapolis. Bowen Technovation has specified and/or installed projection globes on several occasions thru the years. Now through our direct relationship with The Elumenati, Bowen will be offering Magic Planets® Powered by The Elumenati.

So we now include the technical drawings, wiring diagrams, autocads, pricing, installation and support directly to end users, fabricators and other system integrators as a part of our packages.

BT has also engineered advanced four-speaker sound systems with wireless mics and other capabilites to support Magic Planet soundtracks and live presentations. Magic Planets® powered by The Elumenati are featured in some of the world’s leading science centers. The Elumenati have partnered with Global Imagination® to offer globes in sizes from 2’-6’, with resolution up to 5.5 million pixels and brightness up to 20,000 lumens driven by OmniFocus™ projection systems.

Magic Planets feature a huge library of content from NASA, NOAA and leading museums, provided through Global Imagination’s StoryTeller™ and The Elumenati’s WorldViewer ™, as well as tools to create your own interactive exhibits for exploring data from a global perspective.
New Wireless Exhibit and Immersive Theater Audience Interactive Systems from BT

By: James Carlson, System Designer Specialist

It’s time to vote! Not in a political election for President or Congress; but instead using interactive polling within an exhibit or immersive theater space.

**Why?** Many schools have integrated audience response systems as a way to engage students as well as assess how they are learning material.

A live instructor can link questions within a presentation to be polled during a lecture, set up exams, or ask a question to the audience about a discussion point.

Being able to see responses from users in an instant allows for flexibility with the materials being experienced and investigation of user comprehension.

Interactive polling adds another way to engage a group of visitors in your content. But how do you do it? Luckily, many of our installations already feature some level of interactivity; polling just adds another level to it.

**One-on-One Exhibits**

Not much new in this example. Let’s say you have an exhibit regarding ecological change here on planet Earth, you could ask your attendees to select from a few options of what could be done to help reduce toxic emissions.

On a kiosk, they could select from recycling plastic bottles more, driving the car less often, or planting trees. Each selection will play a video on its respective topic.

This simple kiosk is great for one-on-one interaction with an attendee; but not as interesting for a large group of 50 kids. But what if it was modified, what if you asked each child to voice their opinion on what we should do to help our planet? They could raise their hands or shout in a cacophony of ideas or they could vote using interactive polling equipment you have provided for them.

**For Large Groups**

Looking back at our sample exhibit, using interactive polling; we can see the results of our class of 50 kids. Let’s say 27 kids voted for recycling more, 13 kids voted for planting more trees, and 8 kids voted for driving in the car less frequently.

A moderator or docent could show the class a video on recycling facts and then lead into a discussion of why the kids didn’t think driving less or planting trees were options they could do. The next day, a moderator could poll another class and end up talking about the benefits of public transit or bicycle riding. *The example above shows “Interactive lesson plans for history topics”.*

**The Technology**

Interactive polling equipment has a wide range of options available from small RF remotes, smartphones/tablets, custom touchscreen kiosks, to buttons integrated in the seat of an auditorium.

While we have certainly provided systems with buttons on seat arms and also RF wireless approaches, we are now focused on wifi-based solutions. One of the benefits of these devices, they are...
very easy to understand and use. The touch screens can display colorful, informative and instructional graphics and your facility logo.

Our AstroFXCommander systems analyze the wifi polling results and present it to the moderator and audiences. Depending on the system used, polling may be anonymous or tracked creating a database that could be analyzed for future exhibit content design.

Bowen’s FXInteractive system is designed around 10 user-customizable modules. So you can start small and expand as needed. These modules can be adjusted for different academic subjects or age groups via an easily edited text-based configuration file. In a planetarium setting an instructor could design a module about the planets of the solar system, one module about asteroids, and another about stars. Each item within these modules will have a short script or movie attached to it to be played based on the option receiving the most votes. Using the example module on planets in our solar system, attendees would vote on an iPod on which planet they wanted to visit.

The moderator can play the selected option and use that as a springboard to learn what the attendees want to learn about. You can revisit the same module over and over or choose to review another module. In addition, a live polling feature is implemented to allow for unplanned polling.

Using the iPad control, the moderator can ask a question and type in answers for the attendees to select. In the live poll mode, there are no linked scripts or movies however. We are currently working on integration with many major immersive theatre projection systems and exhibit content management systems.

Adding an interactive response system to your visitor experience may increase attendee knowledge retention of your content, create a fun and engaging learning environment, and also provide valuable data for analysis on trends and ways to improve your exhibits.
ping the theater as contracted by the main Jordanian contractor EUBC (Engineering Universe for Building & Contracting).

I’ve worked with planetariums for most of my career, and through the International Planetarium Society (IPS), I’ve met and worked with other planetarium professionals from around the globe. At Bowen Technovation I’ve also traveled to several countries, including China and across Europe, to install planetarium packages, but this was my first time visiting the Middle East and Jordan. For those interested I’d highly recommend it. Historically after World War I, this area was once a British protectorate, so getting around was easier than I thought. Most signs are in English along with Arabic, and most people speak at least some English.

I arrived first to manage the installation of the planetarium equipment and for on-site automation programming. Jeff Bowen followed a couple of days after to tune the audio, commission the theater, and we both participated in training. SkyPoint CEO Marco Cosmacini states “SkyPoint Planetariums participated to this project working for Bowen Technovation. David and Skypoint installed a Digitarium Kappa. The single channel system provides 2 megapixel with 7500 lumens over the 10.5m TecnoDome. A narrower vertical projection angle has been used to have a lower fish eye lens which does not disturb the dome view from the seats and a dedicated, customized metal chassis for the projector was built by Skypoint to respect and emphasize the great design made for the planetarium room.”

During the installation the architect, owners’ representative, government officials, and other VIP’s toured the theater, and were impressed by the technology. Everyone appeared quite proud of the theater when it was completed.

One of the perks working at Bowen and traveling to foreign countries is being able to take time off to do a little sightseeing. Jordan has a long history with many cultural and historic sites, including ancient roman cities within and near Amman. Jeff was able to visit a couple Roman sites on a previous trip, so this time we took up our host offer to go to Petra, which is an archaeological city in southern Jordan, known for its spectacular architecture cut out of the solid red rock canyon cliffs. I was familiar with the most famous façade known as The Treasury, which was featured in the film Indian Jones and the Last Crusade. What I didn’t realize is, although The Treasury is the best example and most detailed carving, it is only one in a canyon full of other carved architecture, both large and small. Towards the end of the canyon, there’s a large amphitheatre and remains of the ancient city, which includes Roman columns. All in all it was a wonderful trip, and if I ever in that part of the world again, I’m told another must is to visit the Dead Sea.

“We were impressed with the competence and the professionalism of designed, supervised and commissioned the project. Their vast experience, the detailed drawings and the clear system description provided by Bowen made our team efficient while installing the systems. Moreover, Bowen team provided comprehensive theoretical and hands on training sessions for each of the installed systems: software, control, sound, video and light. I would be honored to work again with Bowen on future projects in Jordan and in the region as well.”

- Sami Janho, General Manager, AVS

For more information regarding the Haya Cultural Centre renovation, this website is in English with great pictures. More resources: The Jordanian Astronomical Society – JAS, and Official Princess Haya Bint Al Hussein Website.