

## **Electronics & Engineering Called Upon To Integrate For Spectra**

Bringing vision to reality for a mega show such as Spectra takes many types of expertise to be involved. The integration and alignment to ensure all the equipment works smoothly is a key element to the success of the show. With this in mind, an open tender was called upon by Marina Bay Sands for this multi-discipline project, which eventually saw the project awarded to Marina Technology and Construction (MTC) and Electronics & Engineering Pte Ltd (E&E) who had partnered each other for the tender. The appointed AV Consultant for the project was Barnaby Hall of Sennen Design, who got involved in the project after the creative designs were in place, but before the heavy engineering works had started.

Sennen Design worked with all the parties, in ensuring all elements of the audio-visual design were properly coordinated and installed before the creative crew came to site.

Outdoor elements, works above and under water, co-ordination with the different organisations involved and exacting integration all made for a challenging project indeed.

### **Sennen Design's Role**

Sennen Design was appointed as independent technical specialists to Marina Bay Sands, providing the AV infrastructure design and co-ordinating the technological aspects such as projection, lighting and audio with the architect, electrical and structural engineers. Sennen also conducted on-site inspection and contract administration before signing off on the project.

“We were appointed at an early stage by Marina Bay Sands to assess the original light water show and advise on improvements that could be made,” said Barnaby.

“Examples of major development during the project included upgrading the water screen projectors to 4K projector stacks and adding projection and enclosures for the ArtScience Museum mapping, which formed part of the overall Spectra experience.

The main challenge was the delivery time frame. We had a moderate amount of time upfront in the design, but the final implementation needed to be a mix of existing equipment (such as water screens and projection pontoons), and the new AV technology. This included new cable infrastructure and fibre distribution, new projection enclosures and audio system.”

### **Electronics & Engineering's Involvement**

E&E's involvement in this project involved the following aspects:

1. Installation and integration of the all the moving lights.
2. Installation and integration of the projectors on the three projection barges.
3. All audio installation and integration.
4. Installation of Control solutions within the control room.
5. Programming of the show.

## Challenges

“One of the bigger challenges was the synchronisation of sound, video, lighting and all other elements that required close coordination and all parties' agreement. Communication protocol for all elements needed to be coordinated carefully to ensure total compatibility. The coordination efforts, coupled with time constraints presented one of the most challenging and sophisticated task to our Project team,” said Gary Goh, Deputy Managing Director, Electronics & Engineering Pte Ltd.

“One of the greatest challenge was in installing the projectors and lighting fixtures that were placed on barges, that floated on water. This required a high degree of installation methodology for our installation team. Using multiple boats and crew, these installations took extensive time to achieve,” commented Chen Shih Yang, Senior Project Manager, Electronics & Engineering Pte Ltd.

## **The audio aspect of the show**

Electronics & Engineering was responsible for supplying the sound system as well as integrating the systems.

“The initial plan was to reuse the original audio system. After assessing this, it was decided that we needed to replace the speakers. Mid-way through the design development, it was decided that there would be an additional set of special effects loudspeakers placed around the venue to provide a sense of movement with the sound,” said Barnaby.

“With regards to the audio technical design, our options were limited in terms of loudspeaker placement. Loudspeakers could not be placed at an elevated height so we needed ground stacks on the water screens (where the original speakers were). We basically provided a one to one replacement, but using a system that would have higher power and a much greater frequency response and clarity. They also had to be completely weatherproof.

Even the coverage area was a challenge as the audience area is 15m deep and nearly 90m long, and the loudspeakers are positioned 30m from a very shallow audience rake – where the area slopes downwards towards the water feature.

Beam steerable line arrays – a type of mounted loudspeaker system – were placed at the rear to provide a low profile and highly directional sound system whereas the front loudspeakers had a very narrow vertical coverage with a fairly wide horizontal one” commented Barnaby.

Facing the crowd are the water jet screens which act as a canvas for images to be projected on. The audio system consisted of JBL VLA901 HWRx acting as front main speakers complemented with JBL 7128 WRx subwoofers.

### **Media Tower**

The two media towers which are placed on the right and left sides of where the audience will gather at the Event Plaza feature EAW QX594 speakers. “We went with the EAWs because the audio content producer needed powerful speakers to cover the entire event plaza in a tight space within the media towers. The EAW PROJECTS

QX was chosen because it is the most powerful speaker available in that size.”

Completing the audio immersive experience are the JBL HP-DS370 Vertical Steerable Column array speakers that are installed to blend in with the facade of The Shoppes at Marina Bay Sands that faces the show. “These speakers were added as the show producers wanted to create a more immersive experience. The columns were specifically chosen as they were more aesthetically pleasing on the retail facade. It also helped that we were able to steer sound towards the audience and away from the glass surroundings,” added Chen.

“It was a very technically complex short term project in a difficult environment! Kudos to everyone involved in turning the vision into a reality,” said Barnaby Hall.