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Inside:

Laservision lights Hong Kong Harbour

On Tour: Atomic Kitten Sting

Technical Focus on Video Technology: RGB meets DMX

Company profiles: ADB Technologies Nordíc

The Hackney Empire reopens

Digital Media for the Jet Set

Show report: ISE, Geneva

Age-Sex-Location at Hammersmith

. . . and more

Symphony of Lights

Hong Kong's spectacular harbourside lighting project

Symphony of Lights

Lunar New Year 2004 saw the premier performance of Symphony of Lights, one of the most ambitious and visually impressive productions ever staged. The setting for this nightly performance is the sweeping foreshore of Hong Kong's Victoria Harbour, while the performers themselves are actually 18 of that city's most prominent harbour-side buildings.

So grand is the scale that of this spectacle that it was designed to be viewed either from boats on the harbour, or from Tsim Sha Tsui promenade - some 1.5km away on the Kowloon foreshore. The instruments playing in this symphony range from the lighting inside buildings and on their exterior features, through to buildings crowned with searchlights, high powered lasers and aerial pyrotechnics. The entire work is performed to music by Sydney musician Dave Roberts, commissioned specially for this production.

Making Plans

The story of the Symphony began some two and a half years earlier, when the Hong Kong Tourist Commission appointed Laservision from Australia, to produce a Victoria Harbour Lighting Plan. Over the ensuing eight months, Laservision's Simon McCartney, in collaboration with lighting designers John Rayment and Peter Milne, consulted with more than 20 departments in the Hong Kong administration, on matters as varied as aircraft flight paths, harbour navigation and the restrictions on the firing of aerial pyrotechnics. By the time it was presented to the Hong Kong Legislature, the document had grown to 150 A3 pages, touching on issues ranging from the level of light pollution over the city caused by misaligned and uncontrolled lighting fixtures, to a proposal for a city-wide lighting spectacle to be implemented in several stages.

The 2003 Lunar New Year celebrations provided an opportunity to demonstrate the possibilities of large scale sound, lighting and projection in a built environment. For this occasion, the consulting team put together a son et lumiere on a 150m x 60m wall of the Hong Kong Cultural Centre in Kowloon. Sponsored by China Light and Power, and widely promoted throughout the city, the 11-minute show was heavily attended and widely acclaimed. This confirmed the administration's enthusiasm for the project and resulted in the Legislature adopting the full report, and with it, the proposal for the spectacle that would become 'A Symphony of Lights'.

In April 2003, Laservision was engaged by the Hong Kong administration to coordinate the implementation of the lighting plan. Their role encompasses all elements of the production concept and design, lighting design coordination and show control system design and implementation. The show that opened for Lunar New Year in 2004, is really only the first stage of the process.

Design

John Rayment, internationally known for his lighting design on the spectacle that was the Opening Ceremony for the 2000 Summer Olympics, has

Hong Kong Harbour's Symphony of Lights, project managed by Laservision of Australia, is one of the most ambitious and visually impressive productions ever staged - and there's much more to come . . .

Andy Ciddor reports for L&SI

The Symphony of Lights at its full height.

been working on large-scale public events for some years now. As one of the authors of the original proposal for the spectacle, John was the logical choice to design the production and oversee the design implementation.

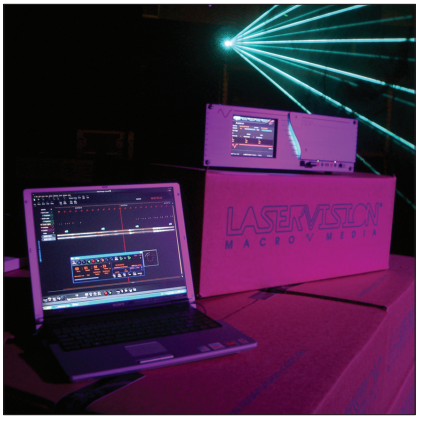
As is his habit in managing large-scale design projects, Rayment's first move was to design a set of data management processes for the project. This allowed him to track all of the variables in a process that would eventually have tens of thousands of control channels for thousands of luminaires spread over kilometres of a city. His primary tool for the initial design was a spreadsheet detailing each building, its capabilities and how to access them: a sheet that stood some 1.8m high when mounted on the design office wall!

The original design concept, as presented to the Hong Kong government, involved some 30 buildings, selected for their location along the city and harbour skyline, their suitability for treatment, and their significance to the life of the city. Eventually, the owners of 18 of these buildings agreed to participate in the first stage of the project, with most of the remaining buildings about to join in, swept along by the enthusiastic responses to the spectacle. The owners of each building agreed to participate in the Victoria Harbour Lighting plan and the Symphony of Lights show through re-examining their building's lighting in the context of the overall city plan and through linking their building into the control fabric.

The level of involvement of the buildings varied substantially. At one end of the scale, the Cheung Kong Group, owners of The Center tower and the Cheung Kong Centre, handed over programming control of two already-spectacular lighting systems. The involvement for Central Plaza and both towers of the International Finance Centre was to crown their buildings with Laservision 40W Stella Ray YAG lasers, while the Bank of China Tower, now sports six Syncrolite colour-changing searchlights on its roof.

However, the Hong Kong and Shanghai Banking Corporation (HSBC) took the opportunity to completely rethink the lighting on their famous Norman Foster-designed headquarters, resulting in a system of nearly 700 Martin colour-changing fixtures in and on the building and its structures. This was topped off with Color Kinetics LED tubes around the masking wall of the roof plant and eight Space Cannon searchlights on the roof.

Each building owner, including the Hong Kong administration, who own five of the buildings, was responsible for the design of the lighting for their building. Some owners brought in lighting designers to update or redesign their building's appearance, others



directly implemented the suggestions in the lighting report, while others hired Laservision to work on their design in the context of the overall plan. In addition to his role as production lighting designer Rayment was directly involved with individual designs for three of the buildings: HSBC, the People's Liberation Army Central Barracks and the Hong Kong Academy of Performing Arts.

Construction snapshots

The implementation of the building lighting was an immense task, requiring ingenuity, expertise and a sense of adventure. Here are a few random examples of how it panned out . . .

Simply acquiring 40+ searchlights, getting them on to the roofs of working buildings in one of the world's busiest commercial cities, anchoring them against 200km/hr typhoon winds, and supplying them with power and control signals, without disrupting the normal activities of the building, is a major task. However, in this project the searchlights were by no means the largest or most complex task.

In the architectural award-winning HSBC headquarters building, where the staircases are encased in glass, Laservision convinced the bank to install 456 of Martin Professional's Cyclo colour-changing fluorescent fixtures to highlight the shape of the stairways. Installing, cabling, patching and testing such an installation in an operational building, housing thousands of employees, presented a major logistical challenge.

Wing Hing Electrical was the successful tenderer for the supply and installation of lighting for the five government-owned buildings in the project. However, although they are a very experienced and successful electrical systems supplier, they had no previous experience in the world of DMX networks, searchlights, bars of LEDs and colour-changing luminaires. For this expertise they approached Serious Staging, who brought in Simon Fraser, a veteran of large scale archi-tainment projects, including such notable undertakings as London's Millennium Dome. Simon likened his role in interpreting the requirements of the entertainment components of the system to a company of electrical engineers and contractors, as being similar to that of the production electrician on a stage show: looking after the interests of the show, whilst allowing the rig crew to get on with their jobs.

Many of the products used, including the majority of the searchlights, many of the wash lights, and the majority of the LED sources specified for the project, came from Space Cannon of Italy, who had no Hong Kong distributor. The Australian Space Cannon distributor, Coemar DeSisti Australia (CDA), who had previously worked with Laservision on other projects in the region, stepped into this role. CDA setup a warehouse and commissioning facility in Hong Kong especially for the project, arranging for over 30 tonnes of luminaires and control gear to be airfreighted directly from the factory in Italy.

Control

Each building has an independent control system, based around Laservision Digital

Data Pump Series IIs, that stream control data to lighting, lasers and pyrotechnics. At the Queensway Government Offices, an additional Digital Data Pump serves as the source for all audio for public address and broadcasting. This includes the music track, plus commentary streams in English, Cantonese and Putonghua (Mandarin). The soundtrack is available to viewers throughout the city, either through broadcast radio stations or via the mobile cellular telephone network (in glorious high-fidelity 13kbps GSM).

The Digital Data Pumps distribute their mix of control signals via building-wide optical fibre networks to the appropriate decoder units. The data stream is then converted back to DMX512, audio, serial data, pyrotechnics control or analogue/digital laser head control. The final runs to all equipment is in standard data formats, over standard copper cables. Well, almost standard - as the DMX512 outlets on Laservision decoders and DMX isolated splitters curiously are fitted with non-compliant combo-style connectors: the ones that accept three-pin XLR or 6.5mm RTS jacks.

Despite each building having a broadband Internet link for system monitoring and show data updates, synchronization of the performance is not dependent on cues sent by a central controller: this strategy eliminates the possibility of a single point of failure in the control architecture. Instead, several times each day, each of the Digital Data Pumps checks its internal system clock against one of the Internet time reference servers to ensure its accuracy. Then, at precisely 8:00:00:00pm each evening, each of the Digital Data Pumps executes its part of the Symphony. If additional performances are to be run during peak tourist season or for special events, they are simply added to the Data Pump's schedule through the Media-Manager software, a task that can be undertaken from any computer connected to the Internet.

Laservision engineers have determined that a worst-case situation with broadband links and Internet latency for clock updates, would see a clock spread of around 40 milliseconds between buildings. As this is in the region of one timecode frame or one DMX packet, it is considered well within acceptable range for this project. The only building without a Digital Data Pump is the Cheung Kong Centre, which already had a modern lighting control system capable of being scheduled with sufficient accuracy.

Plotting

The vast scale and very short timeframe involved in putting this project together meant that there was never going to be a plotting session in the usual meaning of the term. Indeed, the majority of the plotting was carried out in the virtual world, often before the lighting systems had been installed or even delivered.

During the construction and installation phase, assistant lighting designer Jeff Lui created three-dimensional CAD models of each

The Players >>>

Hong Kong Academy of Performing Arts (APA)
30 Martin Exterior 600s (9 DMX ch.)
12 Martin Exterior 200s (7 DMX ch.)
3 Space Cannon Easy 7k searchlights (10 DMX ch.)
35 Space Cannon LED Metamorphosis LED Bar (7 DMX ch.)
11 High End Systems AF1000 Dataflash strobes (3 DMX ch.)
1 Laservision Digital Data-Pump (Series II)
Run off 2 Universes
1 Laservision DMX decoder
2 Laservision Fibre DMX decoders

Bank of China (BOC)
6 Syncrolite7k searchlights (9 DMX ch.)
1 Laservision Digital Data-Pump (Series II)
Run off 1 Universe
1 Laservision DMX decoder

Chung Kong Centre
Existing lighting

Hong Kong City Hall
122 Space Cannon Metamorphosis Bar (7 DMX ch.)
1 Laservision Ltd Digital Data-Pump (Series II)
Run off 3 Universes
1 Laservision DMX decoder
2 Laservision Fibre DMX decoders

Exchange Square One & Two
14 Studio Due City Beams (7 DMX ch.)
6 Syncrolite 3k Searchlights (9 DMX ch.)
4 Coemar Flex Spots (28 DMX ch.)
1 Laservision Digital Data-Pump (Series II)
Run off same single Universe as Jardine House
1 Laservision DMX decoder
5 Laservision Fibre DMX decoders

Hong Kong Convention and Exhibition Centre
82 Space Cannon Focus 1200s (8 DMX ch.)
48 Space Cannon Focus 700s (8 DMX ch.)
122 Space Cannon Metamorphosis LED Bars (7 DMX ch.)
14 Space Cannon 2.5k Color Arts (8 DMX ch.)
2 Laservision Ltd Digital Data-Pump (Series II)
Run off 5 Universes
2 Laservision DMX decoder
10 Laservision fibre DMX decoders
1 Laservision audio decoder

International Finance Centre 1
40W Laservision Stella Ray YAG Lasers
Laservision Sinodial Laser Decoder (Series II)
1 Laservision Digital Data Pump (Series II)
1 Laservision DMX decoder
1 Laservision laser decoder

International Finance Centre 2
40W Laservision Stella Ray YAG Lasers
Laservision Sinodial Series Laser Decoder (Series II)
1 Laservision Ltd Digital Data-Pump (Series II)
1 Laservision DMX decoder
1 Laservision laser decoder

Jardine House
14 Studio Due City Colors (7 DMX ch.)
24 Studio Due City Beams (7 DMX ch.)
4 Syncrolite 3k searchlights (9 DMX ch.)
1 Laservision Digital Data-Pump (Series II)
(Same DDP as Exchange Square)
Run off 1 Universe
1 Laservision DMX decoder

>>>continued on p52

HSBC Headquarters
8 Space Cannon Easy searchlights (10 DMX ch.)
119 Martin Exterior 600s (9 DMX ch.)
96 Martin Ext 200s (7 DMX ch.)
456 Martin Cyclo 3s (3 DMX ch.)
3 Laservision Digital Data-Pump (Series II)
Run off 5 Universes
1 Laservision DMX decoder
10 Laservision fibre DMX decoders

Mass Mutual Tower & Harcourt House
37 custom LED (3 DMX ch.)
1 Laservision Digital Data-Pump (Series II)
Run off 1 Universe
1 Laservision DMX decoder

Chinese People's Peoples Liberation Army
24 Space Cannon Focus 1200s (8 DMX ch.)
4 Space Cannon Color Art 4k (8 DMX ch.)
5 Space Cannon Easy 7k searchlights (10 DMX ch.)
9 Griven Colorados (5 DMX ch.)
1 Laservision Digital Data-Pump (Series II)
Run off 2 Universes
1 Laservision DMX decoder
2 Laservision fibre DMX decoders

Queensway Government Offices
5 Space Cannon 7k searchlights (10 DMX ch.)
2 Laservision Ltd Digital Data-Pump (Series II)
(one used to run audio for broadcast and pyro)
Run off 1 Universe
1 Laservision DMX decoder
1 Laservision fibre DMX decoders

Sun Hung Kai Centre
4 Space Cannon Easy 8k searchlights (10 DMX ch.)
2 Space Cannon Color Art 7k (8 DMX ch.)
2 Space Cannon Color Art 4k (8 DMX ch.)
1 Laservision Ltd Digital Data-Pump (Series II)
Run off 1 Universe
1 Laservision DMX decoder
2 Laservision fibre DMX decoders

Central Plaza
40W Laservision Stella Ray YAG Lasers
Laservision Sinodial Series laser decoder (Series II)
Existing lighting
1 Laservision Digital Data-Pump (Series II)
Run off 1 Universe
1 Laservision DMX decoder
1 Laservision laser decoder

From top: a Laservision technician with one of the Martin Exterior fixtures, over 250 of which were used on the project; Space Cannons in situ; the HSBC building in blue.

building and its lighting facilities. Few of the buildings already had useful 3D CAD documentation; the majority existed only in two-dimensional CAD, whilst a couple were old enough to be designed entirely on paper, thereby presenting Jeff with a major task even before the plotting began. When completed, the 3D CAD models were transferred into the Martin Show Designer visualization program, in which each building would be individually cued and plotted.

As a programming platform, Rayment and long-time programming associate Matt King, built up a Hog PC / Martin Show Designer computer system, fitted with a Programmer wing, a Playback wing, a very tasty four-headed video card and four LCD monitors. Lighthouse in Holland supplied all additional and modified fixture libraries for the varied mix of searchlights, washlights, strobes, fluorescents and LEDs.

As each building reached completion, the lighting design team would then refine the pre-programmed cue states live on the real building using the HogPC, then upload them to the Digital Data Pump via broadband data link.

Working from Rayment's excruciatingly detailed spreadsheets, over a period of three months, each building's initial looks were programmed on the HogPC/Show Designer system, then transferred to the Digital Data Pumps as they came on-line. In the case of the Cheung Kong Centre, where the building already had a programmable lighting controller, Jeff Lui prepared detailed channel-by-channel cue sheets which were then loaded into the controller by the building's technical staff.

Where next?

The commitment from the Hong Kong administration is to complete the full lighting plan, as proposed by Laservision. Within days of the first performance, work was already underway to incorporate additional buildings into the show, with the number soon to approach the original best-case number of 30. At the same time, stage two, a more immersive, and even more spectacular event, is now in its planning stages and may well be seen for Lunar New Year 2005. Best of all, however, is the news that the city's planners are looking at methods of reducing the amount of stray light polluting the skies over the city. That should really tighten up the tuning of Hong Kong's Symphony of Lights.

Andy Ciddor