SOCHI 2014 WINTER OLYMPIC GAMES

Company: Avolites, Avolites Media
Location: Sochi, Russia

Featuring 7,000 performers, the Closing Ceremony at the Sochi 2014 Winter Olympics was directed by Daniele Finzi Pasca. It took place in the Fisht Olympic Stadium, under an 'LED Forest of Light' made up of 204 12-metre LED tubes and powered by an Avolites Ai S6 server and Tiger Touch II console.

All of the LED tubes, designed and custom-built by Tait Technologies, boasted a 360° viewing angle, which enabled both the 46,000 spectators and the global television audience to see the same effect; when a countdown to mark the end of the Games, which appeared on the screens above the stands, hit zero, everybody could see the LED Forest explode into bright colours.

Content creator Immersive programmed and pixel-mapped the 240 individual LED rods, utilising Ai's 3D stage interface to visualise the installation. Lead operator for the project was Avolites Media's, Ciaran Abrams, supported by Martin Harvey from Immersive.

"The 204 moving LED tubes required an incredible amount of raw computing power from the S6 Server, and it performed flawlessly," said Ciaran. "The fact that one single machine was able to power the whole forest and deal with a multitude of tasks is still quite astonishing.

Ciaran and his team generated new model, texture and fixture data for every frame, processed information about column position and manipulated how the video was portrayed on the forest for each individual tube, a process which had to be repeated 204 times.

"This amount of processing power would not have been possible on a lesser machine, we were really pushing the boundaries of what a computer can do," added Ciaran. Suppliers Tait Technologies employed the Ai S6 server for the project.

"Access to the S6 server was a massive help, not only in Sochi, but also when using for pre-visualisation in London, where the creative team were able to see and experiment with all content before the event," continued Ciaran. "When using it for pre-visualisation we were using four or five outputs to give the content team the best understanding of how the forest could look and what we could do to facilitate their creative ideas."

With the Ai server controlling all of the content and volumetric distribution, the Avolites Tiger Touch II console's cue list was able to control playback of video clips and ArtNet levels assigned to playback faders, allowing manual control of video effects. Additionally, the Tiger Touch II gave instant adjustment of fixture intensity to balance levels for the events live cameras.

Immersive's Mark Calvert concurred: "The Ai visualiser enabled the show designers, content houses, programmers and technicians to work remotely on the project and still see the installation within the same 3D model of the stadium. The 3D visualiser enabled ideas to evolve in a real-time 3D space and in a number of cases has helped visualise and deliver some world-first achievements. The visualiser makes realising a design a tactile, easy to navigate, real-time experience."

www.avolites.com / www.avolitesmedia.com

Company: DiGiCo
Location: Sochi, Russia

Director of Auditoria, Scott Willsallen was Audio Director and Designer for the Opening and Closing Ceremonies of the Sochi 2014 Olympic and Paralympic Games, in which DiGiCo played a part, at the 40,000-seat Fisht Olympic Stadium. For the primary stages of planning, Scott was engaged by the Ceremonies Staging Agency. CSA contracted Five Currents to deliver the Olympic Ceremonies and World Wide Shows to deliver the Paralympics, who then brought Scott in for the delivery stage of the project.

www.mondodr.com

Italian company Agorà of L'Aquila won the bid to provide the audio equipment and 34-strong team of specialists, who would install and manage the set-up, including nine containers of equipment. No newcomer to Olympic events, Agorà previously supplied equipment, logistic support and technical staff for similar ceremonies at the 2006 Turin Olympics.

"The console network at Sochi was quite similar to London 2012. FOH, monitors and main broadcast each had a pair of mirrored SD7 consoles, one of which was connected to the Optocore network via Madi, the other to DiGiCo SD Racks, also via Madi," Scott explained. "Using Madi as the connectivity for all consoles makes mirroring the SD7s really easy and ensures 100% fail-safety not only on the mixing systems, but also the signal transport networks."

Manned by Richard Sharrat, the FOH consoles were at the northern end of the show control rooms on Level Five. The monitor consoles were located adjacent to the patch room on Level Three, under the control of Agorà's Umberto Polidori. Next door to the Olympic Broadcast Service trucks, Andy Rose headed up the broadcast facility. Griff Hewis, who controlled two mirrored SD11 consoles, connected to the network, also looked after the 'atmos' sub-mix - the 5.1 audio was mixed with stereo crowd mixes to obtain the sonic environment of the venue.

Auditoria's, Justin Arthur configured the consoles' audio and data networking, while Daniele Tramontani acted as Agorà's Senior System Engineer at both ceremonies. Audio Consultant Bobby Aitken worked with Scott to EQ the Olympics' system, along with Richard Sharratt, who was EQing stems received from the music department. Seven SD11 surfaces were deployed alongside the main consoles and used as a monitoring interface for the replay team, patch engineer and RF engineer.

"One big issue faced was the transportation of the broadcast audio facility, which was unable to be freighted directly from Rome to Sochi, so we had a very brief period to dismantle the truck, pack the equipment for air freight and build the facility into portable cabins, which were acoustically treated on-site while the equipment was being pushed through customs," Scott said, talking about the challenges faced in organising such a big event. "This was accomplished in just three days - a great job by all concerned!" **www.digico.biz**

Company: Optocore
Location: Sochi, Russia

The Sochi 2014 Olympic Winter Games drew to an end with a spectacular Closing ceremony in Sochi's newly constructed, 42,500-capacity Fisht Olympic Stadium. Auditoria's Scott Willsallen, Audio Director of Opening and Closing Ceremonies, designed the technological infrastructure for both spectacles. Auditoria also provided the design and operational team, as well as Audio Consultant Bobby Aitken.
Scott placed all of the transmission onto a 24-node Optocore dual redundant ring, working with two different creative teams to fulfil different objectives. Where the Opening Ceremony, designed by Konstantic Ernst and directed by Andrei Boltenko, was operatic and cultural, the Closing Ceremony, directed by Italian Daniele Finzi Pasca, was lively and festive, featuring nearly 800 performers to represent centuries of Russian history.
Touring specialists Agorà, under Project Manager Giulio Rovelli, were chosen by Scott to design the routing topography, including separate networks for broadcast and live. They purchased large quantities of energy-efficient Optocore R Series AES-EBU and Madi interfaces from Italian distributors Audiosales, adding Optocore devices including the DD32R-FX, DD4MR-FX, X6R-FX and TP, and X6P/X6 AD/DA converters to their inventory. This connectivity formed the hub of an audio infrastructure which, in addition to the fibre signal transport, involved custom RF solutions and LAN networking across a coverage area measuring up to 4,200-metres.
Optocore was able to matrix a high channel count over such a distance, owing to the dual redundancy and robustness that makes it reliable; the company's 2.21 protocol enabled 2GB bandwidth operation, and was crucial to meeting the requirement of a high channel count. By using all 24 IDs, Agorà could exploit the maximum capacity of the fibre ring. The deployment of TP (Twisted Pair) devices provided a Cat5 extension to expand the I/O of the field nodes as required.
Auditoria's, Justin Arthur, Senior Systems Engineer for both the London and Sochi Olympic ceremonies, adopted a similar approach to the one taken in 2012. The exception to this was fielding the new L-Acoustics K2 system; Optocore sent AES feeds to 230 of the new enclosures, arranged in different hangs, as part of a massive L-Acoustics PA deployment.

The field nodes were all analogue in / AES out and control nodes were Madi I/O at the FOH console, where Richard Sharratt mixed the sound. Field inputs were passively split into A (Optocore) and B (analogue) networks. DiGiCo consoles output via Madi to Optocore with full analogue back-up.
DiGiCo SD7s at FOH and monitors were duplicated on the B network, which featured SD7B and SD11B broadcast desks. The broadcast ring tied the main system to the OB truck of Delta Media, another Optocore partner, for all necessary I/O. They also delivered downstream mixes of playback, live and atmos microphones for the broadcast of the Ceremonies to OBS (Olympic Broadcast Services), with Andy Rose mixing the broadcast sound.
"As for the creative teams I try and understand the different needs for each show. Both Andrei Boltenko and Konstantin Ernst were very clear in what they wanted and were straightforward in expressing it." Some of the more complex work had involved providing discreet speaker system for a 21-second sound effect to accompany the entrance of a train and mechanical horse, and then for a seven second high impact sound effect to add theatricality on another occasion. "It was this attention to detail that was important," he said. **www.optocore.com**

Company: Renkus-Heinz
Location: Sochi, Russia

For the Sochi 2014 Winter Olympics, a dozen new world-class venues had been specially erected and outfitted with high-performance audio, video and lighting systems.
Moscow's Avallon designed and installed multiple Renkus-Heinz systems in five Olympic venues, including the Iceberg Stadium, home to the figure skating and short track competitions. As Avallon President, Sergey Vashchenko explained, it was the most challenging of the installations.
"Since music is such an important part of the performance, figure skating competitions have some of the most stringent sound requirements," said Sergey. "Even after working with the building's designers to reduce the reverb time from 7.5 to 3.2 seconds, we still knew we needed to create a system with great performance and tight pattern control to keep the reflections under control."
Eight Renkus-Heinz CEM61 and CEM62 high power, mid-high modules cover the audience seating, with eight CE-3TLO subwoofers covering low frequency reinforcement. The systems are hung around a central Media-LCD display, while 10 CT7M TRAP boxes provide music to the skaters on the ice.
"During the EASE acoustic modeling phase, we looked at a number of options, including more traditional line arrays," Sergey continued. "But we were not happy with the difference in sound quality between the audience and the ice. Moreover, there was some concern that a line array might block the sightlines for some of the upper-level seating. The optimal solution was to mount all the loudspeakers on the video screen frameworks, and the Renkus-Heinz CEM and CT series speakers offered coverage patterns that suited this arrangement very well."
Power and signal processing for the systems was provided by Dynacord DSA-series multichannel amplifiers and P64 matrix processors. Amplifiers and DSP were located within the signage frameworks to reduce cable runs and assure low impedance. Audio signal was fed via fibre from the Stage Tec Auratux 16-T2Z digital console. "We assembled the entire system within the framework while it was on the ground, which made things a bit easier," added Sergey.
Consultant Yury Indlin from ADI carried out acoustical measurements, while Sergey designed the system, and Avallon's Vladislav Azarov took control of installation and commissioning. "During the competition, sound levels are limited to 85-87dB," said Sergey. "But during testing we were able to achieve levels of 103dB, with even coverage across the entire facility."
In the Fisht Stadium, home of the Opening and Closing Ceremonies, Avallon installed six Iconyx IC7-II mechanically steered array systems in the VIP lobby, as well as a pair of PNX-82 two-way complex conic loudspeakers in the press centre. Elsewhere, the training centres for hockey and figure skating were both outfitted with multiple TRX151 two-way systems.

www.renkus-heinz.com