PURE LIVE DIRECTORY 2015

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Special Edition
Live Companies

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LIVE PRODUCTION

The Business of High End Live TV:

Broadcasting Live Events in Ultra High Definition (UHD) and Super Hi-Vision (SHV)

Flashback: Nearly 10 years ago in December 2005 Host Broadcast Service (HBS) announced to produce all 64 matches of the FIFA World Cup 2006 in High Definition (HD). In 2008 Olympic Broadcast Service (OBS) covered nearly all the Olympic events in Beijing in HD and in 2010 at the FIFA World Cup in South Africa HBS already had the time to test 3D by producing 25 matches in 3D in addition to the excellent production of 64 matches in HD. The London 2012 Olympics were the first Games where OBS was producing every event in HD, however Japanese broadcaster NHK started to cover some of the events in SHV. And one year later, after Tokyo was awarded the Olympic Games in 2020, NHK confirmed to produce these games in SHV. NHK continued its SHV testing during the2014 Olympic Games in Sochi, while HBS included the coverage of 3 matches of the FIFA World Cup 2014 in Brazil in UHD into the official production plan (the signal was distributed via satellite to cinemas). In addition NHK produced 11 of the 64 matches in SHV. The TV Live Production community has been here before. Today it may seem that HD has been around forever but it really wasn't until 2008 that HD became ubiquitous. And it is worth remembering the tumultuous early years of HD broadcasting and the constant state of uncertainty as companies committed to, then backed off of HD.

The only constant in Live Production is change

And then there was nearly a decade of U.S. broadcasters' hearing from their European counterparts that widescreen PAL was all that was needed and that Europe would most likely skip 720p and 1080i and go to 1080p. European broadcasters never did deliver on that 1080p promise. And, ironically, 1080p is now seen as a real, possible solution for meeting viewers' 4K needs. The newest 4K consumer sets have rock-solid internal up-conversion technology that can do wonders with a 1080p signal. The 2016 Olympic Games in Rio will not see the production of any of the events in UHD. According to Yiannis Exarchos, CEO of OBS, there is no demand from the rights holding broadcasters which are mainly public broadcasters and many of them have budgets that are squeezed more than ever. Instead OBS is working with NHK to produce SHV content. In Exarchos opinion 8K SHV is much more a game changer then 4K UHD and he said, "You can really see a huge difference in experience whereas the gap between HD and 4K is far less." Nevertheless OBS has a history of using the Olympic Games as a launch pad for new viewing experiences and is currently investigating virtual reality technologies with an eye towards trials at the 2016 Games. In 2018 we will see the opinion of HBS: Will UHD become part of the production plan at the FIFA World Cup in Russia or will we only see additional tests of NHK.

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LIVE PRODUCTION

Fast forward to some facts:

Worldwide operating rental houses like Bexel and VER are heavily investing in UHD cameras and UHD lenses, dedicated 4K UHD OBVans are available on the market (Telegenic, Globosat, Gearhouse, CTV, TopVision, Mobile TV Group, NEP, and others). On page 56 we present the first 4K UHD truck in China (JSBC), while on page 141 we explain some background on the SHV development partnership between NHK and Ikegami. In addition you will find brief descriptions of brand new production gear like OBVans, Flight Packs and Studios as well as portraits of 17 live production companies that are specialists in carrying out local events but also international events.

We continue with 23 reports about international live events in the sectors of sports, entertainment, politics and culture like the Eurovision Song Contest (page 6), Glastonbury (page 196) Volvo Ocean Race (page 16), UEFA Champions League Final (page 63), the 40th anniversary of the Orchestre National Lille (page 28) or the general elections in the UK (page 109), to only name a few.

Enjoy.

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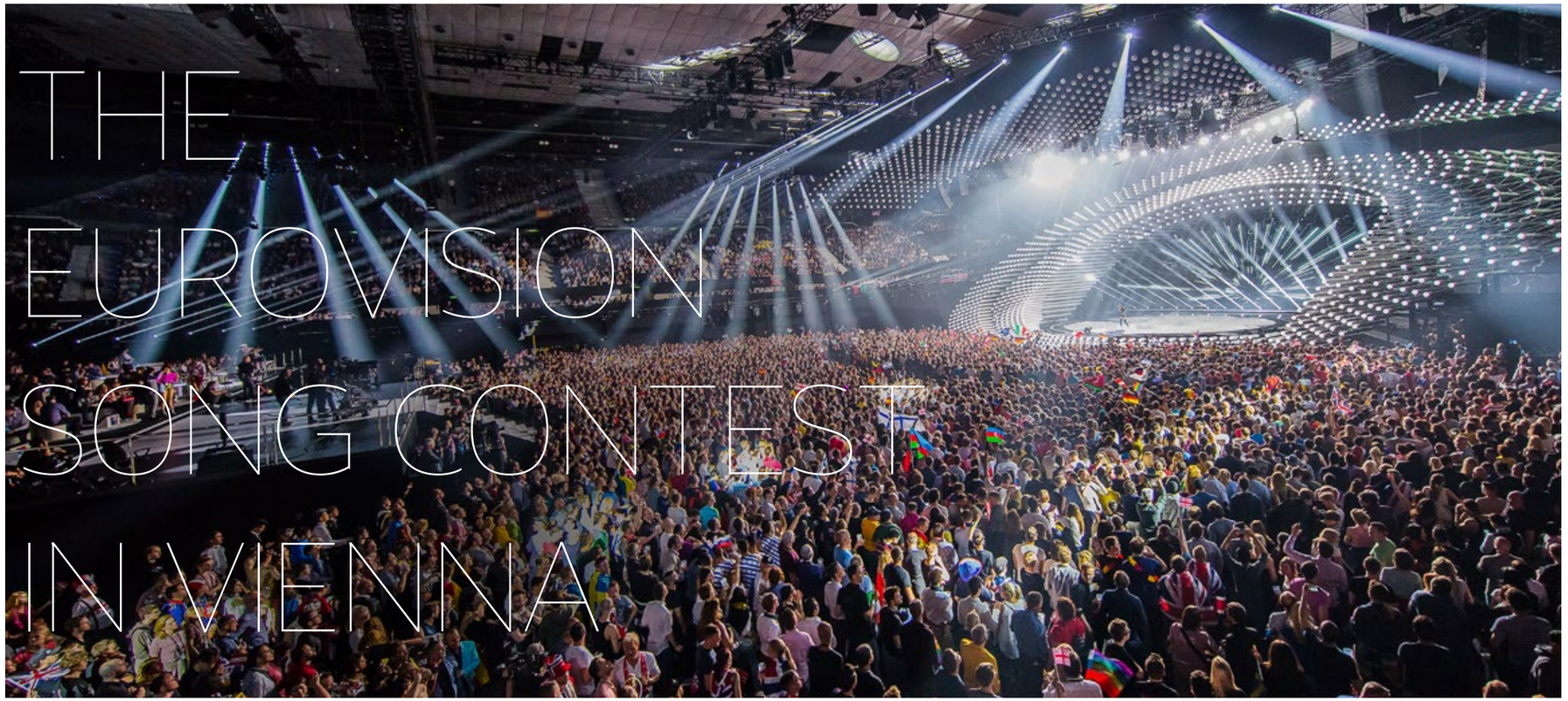


THE EUROVISION SONG CONTEST IN VIENNA

After Austria's first and only previous Eurovision Song Contest (ESC) victory in 1966, Conchita Wurst succeeded in bringing the ESC 2015 from Copenhagen to Vienna. The 60th anniversary of the Song Contest is truly historic in many ways: Geographical boundaries have been broken with the unprecedented inclusion of Australia into the 2015 Eurovision family and the motto "Building Bridges" aimed at making connections across national borders, across cultures and indeed across decades celebrating tolerance and inclusion while promoting respect and tolerance.

The production design reflected these underlying goals. The bridge concept emerged as a physical structure linking the stage with the audience, thus creating new possibilities for affinity and connection. In turn, the dynamically illuminated eye was symbolizing shared vision: diversity enhanced by a mutual respect between cultures, countries and people. Creating a show for an audience of almost 200 million people is a complex challenge and requires teamwork at its very best by including creative experts like Al Gurdon, one of the top lighting designers globally and Florian Wieder, one of the best set designers, into the creative crew which was supported by technical specialists implementing the best technical tools and solutions to fulfil all requirements, wishes and requests of the creative team.

ORF HD

VIDEOHOUSE
media facilities

The Stage

This year's stage concept emblematized the "Building Bridges" vision by a haptic eye. Countless steles, symbolized the participating nations, were generating an entity – and formed a giant eye that dominated the room as a statement. The eye saw itself as a portal and formed a bridge between the artists and the audience all over the world.

The eye was spanning the entire stage and consisted of about 1,300 individual pillars with a width of 43 meters, a height of 14 meters and a depth of 22 meters. The steles were equipped with LED technology and produced a wide variety of lighting effects. The stage surface in the eye had a width of 14 meters including a LED floor with a diameter of 11 meters. In the background was an LED wall with a width of 30 meters and a height of 9 meters with a resolution of 7.5mm. It could be hauled apart in the middle to a width of 13 meters.

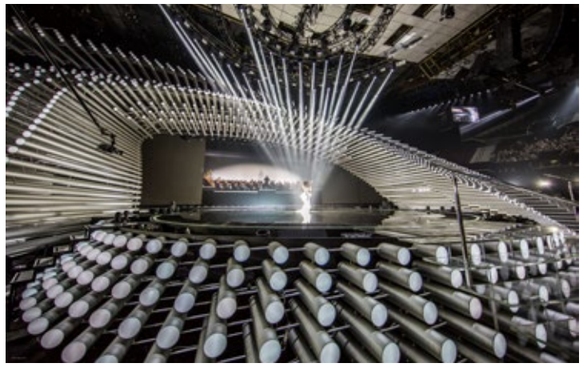
Some further facts: All 1,300 steles consisted of 3,225 meters of tube material and had a LED-lit front fascia. - The circular main stage consisted of 450 floor-integrated LED modules which were working also with very low angled camera views. - For special effects 45 linear meters of metal grids were placed next to the stage. - To highlight edges of the stage 300 linear meters of LED strips were installed. - Nearly 5,000 square meters of floor space were used for designed set and technical areas, starting with the stage, presenter areas, EBU positions ... and ending with FOH and commentator areas. - Several roller screens and fast fold screens allowed the audience to see live camera views and other contend projected with 10 DLP projectors. - Special camera systems and lighting effects were integrated in the stage design.

Experienced TV lighting director (and Emmy Award winner) Al Gurdon, was undertaking his third ESC. Gurdon was supported in his product selection and inventory sourcing by long-term associate, PRG's Richard Gorrod - while the latter's counterpart at PRG Germany, Matthias Rau, was also responsible for providing much of the kit. After working collaboratively for the last 15 years, Gurdon and Gorrod have developed a symbiotic relationship. "A lot doesn't need to be said as I know how Al works and what he requires," states Gorrod. For ESC it was essential that every act had a personalised set, as the PRG man explains. "The core rig needed to have many possibilities for creating different looks. We speak to the countries beforehand and confirm what they require."

However, this year production was confronted by physical challenges, not least being the low ceiling height, with the result that the set was virtually touching the roof. Working within these parameters, the design was based around a huge 83-lamp wall - a portal forming a bridge between the artists, their delegations and the audience all over the world, which flew in and out. When in 'Out' mode, the bridge revealed the orchestra, which performed during the interval and opening acts.

For ESC Al Gurdon placed 25 of the X4 Bar 20 from GLP in a line at the back of the stage (in wide mode rather than pixel mapped) to form a horizon below the tracking video wall. "The colour and the great dimmer curve make them the perfect unit for this," he states.

The fixtures were driven from the PRG V676 that provided some great programmed effects. "The impressions responded well," he continued. "We used them in extended mode for the 16-bit colour control with a PRG S400 backbone for data distribution." The lighting team started its work eight weeks prior to the show - five weeks for preparation, three weeks set-up and tuning and finally the show week. The participating countries had sent lighting requirements and conceptual ideas in advance to the lighting professionals who then developed the lighting concept under the guidance of chief lighting designer Al Gurdon.



Working closely with Senior Creative Director Kurt Pongratz (ORF), Richard Gorrod and his programmer Mike Owen translated the ideas of Al Gurdon into a fascinating light show where in addition to GLP Clay Paky products played a key role: 48 Sharpy Wash 330, 83 A.leda B-EYE K20, 74 Stormy and 172 Mythos Moving Heads were part of the fascinating light show. Gurdon choose the Mythos because it performed just as well as a beam light as it does as a spotlight. The colour mixing facility was also a crucial decider because it allowed to fine tune and colour match to all the other mediums being used on stage. Accented by LED screens integrated in the show floor the flair could be changed constantly to build different atmospheres for each performer on the stage. With almost 40 different nations taking part, each demanding its own defining look, Gurdon had his work cut out:

"The challenge for us was to guarantee each nation's song felt unique," explains Gurdon. "At the same time we had to deliver a cohesive feel to the overall look of the broadcast. Because of this I wanted to ensure the backbone of my lighting rig was consistent."

Designed specifically for television, Eurovision presents a number of its own unique challenges. Pulling performers out from a video heavy backdrop, conveyed on a 2D medium, while keeping colour and intensity balanced across all the output mediums can be testing. Bringing additional visual depth to the lively stage and some stunning beam effects, Gurdon designed a matrix of Clay Paky A.leda B-EYE K20s. These were rigged in such a way as to evoke one giant B-EYE and the whole matrix could migrate from behind the main video backdrop to above the screen, offering a number of different effects and looks.

"For some of the performances we removed the rear video screen and used the B-EYE matrix as a dynamic, high impact backdrop or beam effect generator. We moved it overhead to shine down and twinkle through the array of end lit pipes that framed the stage," Gurdon continued. "This was extremely effective, especially for Ireland's forest scene. The fixtures allowed us to generate a look that felt organic from something very high-tech. They also brought a great dynamic into the room and could also be used to extend the height of the set."

Adding further dimension and for those moments requiring additional ooomph Gurdon peppered his rig with a number of Clay Paky Stormy CCs, which delivered intense strobing and super bright swathes of colour across the back of the stage. "Clay Paky fixtures have definitely become the standard in stage and TV lighting," Gorrod said, "they're relatively lightweight and use remarkably little power for their resulting output. The Mythos is just 470W. This means that, compared to prior Eurovision events, the power consumption on this year's contest had been significantly reduced."

The TV Production

A total of 26 cameras were available to experienced live director Kurt Pongratz to successfully translate the stunning stage design, the excellent visual realizations on the giant LED walls and the enchanting ball ballet on the ceiling into a successful illusion that conjured nearly 200 million fans on their TV sets at home

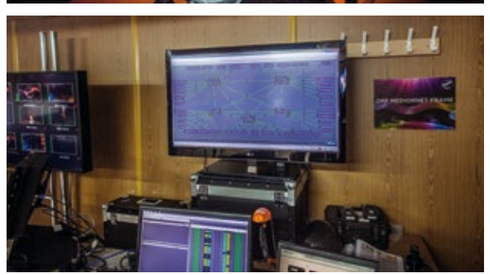
Among the 26 cameras was a Blackcam circling the stage, a 2D Cable Cam, five Pedestal Cameras, three Steadicams, seven Handheld Cameras, three Hotheads, two Speedcams on rails and for the first time in Europe a "JitaCam" - an extendable camera crane hanging from the ceiling.

To be able to maintain a flexible setup and a safe backup solution, host broadcaster ORF had hired two identical OBVans from Videohouse NV. The main production unit was Videohouse OB one while the backup unit was Videohouse OB two. Both production units were double-extended 16 meter trailers. Both units had been involved in many major events around the world, including the previous Eurovision Song Contest in Copenhagen. Both units were linked via a Technical Operation Centre (TOC) on site. All cameras were controlled via the TOC and only the complete processed video signals were distributed to the two redundant OBVans. In the case of a failure the TOC could change the signal distribution between the two production units . The time limiting factor here was only the moving of the crew from one OBVan to the other, the switching of the signals could be performed within seconds.

Because all the music contributions had a predictable length and flow, it was decided to program the mixing of the 40 acts already during the rehearsals and to run the three shows fully automated. The software doing this job was CuePilot. CuePilot not only takes over the editing, but also informs the camera operators via a clearly structured interface about the current and upcoming cuts via smartphone or iPad.
The Eurovision Song Contest was produced in 1080i50 with 5.1 Audio distributed in Dolby-E format. Two identical equipped sound mobiles from ORF were acting as main and back-up unit in close cooperation with OB one and OB two from Videohouse, while for the coverage of the daily press conferences Videohouse had supplied their OB14.

Eurovision goes Audio over IP

All of the contest's audio signals were routed via a RAVENNA/AES67-based IP infrastructure for the first time at a Eurovision event. Both the Lawo Nova 73 audio matrix - including all connected DALLIS I/O systems used by ORF's broadcast supplier Videohouse - and the video and audio distribution of the Lawo commentary solution were based on IP networking technology. All of the audio signals were collected by a central audio router, to be distributed to all of the event's suppliers and OB vans. This setup minimized equipment and cabling requirements while significantly increasing the flexibility of the installation. The central audio infrastructure was based on a Lawo Nova 73HD audio routing core, which formed the heart of the audio operation. Ten DALLIS I/O systems were connected to the core via RAVENNA Audio-over-IP technology, allowing decentralized collection and distribution of all signals in the venue, including 96 Sennheiser wireless microphones, 32 Sennheiser in-ear systems and a Pro Tools playback system. The Lawo infrastructure also enabled distribution of all of the sync and timecode signals needed for the production.



Total View HD Ü2

SloMo Area

Production Area and Monitor Wall

Audio Area

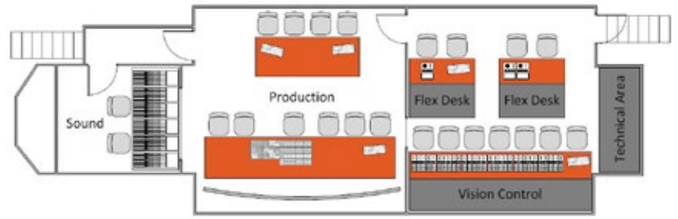
Inside View

Camera Shading Area

TECHNICAL SYNOPSIS

HD one
HD two

OB Van



Video

- Up to 24x Grass Valley LDX Series Cameras
- Connectors on Cameras, CCUs and Cables: Lemo Fiber,
- Lenses from Canon, all Focal Lengths available
- Tripods from Sachtler and Vinten
- Vision Mixer: Gras Valley Kayak HD 4ME with Kayenne 3ME Panel and Kayak Sat Panel
- Monitors Wall: 32x JVC 20" HDSDI and 3x JVC 24" HDSDI
- Multiviewers: Miranda Kaleido X
- Audio Monitoring: Genelec 5.1
- Up to 18 VTR Positions
- Up to 12 EVS Positions
- Digital Glue from Axon
- Video Controller: VSM from L-S-B
- Video Matrix: Grass Valley Mirada 8288 with 264in x 372out

Audio

- Audio Mixer: Lawo mc 66
- Audio Router: Lawo Nova
- Audio Monitoring: Genelec 5.1
- Microphones from Sennheiser, Schoeps, DPA, Neumann

Intercom

- Matrix: Riedel Artist 112 x 112
- Wireless Talk-Back: Motorola with RiFace

Coach Built

- Length: 13,6m
- Height: 4,0m
- Width (stowed): 2,5m
- Width (expanded): 5,0m
- Weight: 40t
- System Integrator: Project Builders

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In total, the Lawo Nova infrastructure routed more than 6,600 audio signals to the OB vans, as well as to the FOH and monitor consoles inside the hall. All OB trucks – including three vehicles from ORF and three from Videohouse – were equipped with Lawo m²66 or mc²56 digital mixing consoles. In addition, the Videohouse trucks were equipped with Lawo V__pro8 video processing systems for audio embedding, de-embedding and format conversion. A VSM system from L-S-B was used for managing and controlling the whole installation.

The Lawo commentary system used by ORF was also based completely on IP networking technology. The 14-member Lawo crew equipped 45 commentator cabins with Lawo LCU commentary units, which were networked via RAVENNA/AES67 with the Commentary Control Room and the Commentary Equipment Room. Here, the signals were forwarded to the Prodys ISDN and IP codecs connecting broadcasters worldwide with the venue. The Lawo commentary system was developed in collaboration with HBS for the 2014 World Cup, and HBS also supported the setup in Vienna with equipment and personnel. The video signals for the 90 video monitors in the Eurovision commentary boxes were streamed to the commentary boxes via Lawo V__link4 Video-over-IP systems. These video screens provided additional information for the commentators, in addition to what they witnessed taking place in the hall.

The project was managed by Lawo as a turnkey solution, including developing the technical concept, implementation, on-site support and equipment from Lawo's rental partner, Audio Broadcast Services (ABS). For the cabling installation 9,000 m fiber optic cable from Sommer Cable were used and at many connection points the HICON FIBER4 connectors were used. ABS has a five years' experience with the HICON FIBER4 connector and with the Sommer Cable OCTOPUS. ABS had no worries to integrate all the OBVans, all the satellite uplinks and the PA system in the Wiener Stadthalle (about 160 Meyer Sound speakers and 8 MIDAS Pro series audio consoles for FOH, monitoring and in-ear) within the MADI and RAVENNA audio network.

In addition a video network needed to be established to connect the TOC and MCR with the OBVans, the sound mobiles, UpLinks and the LED screens and projectors within the Wiener Stadthalle which had to receive TV signals. This distribution network was established by Riedel with the integration of a MediorNet system (45 MediorNet mainframes to cover 127 HDSDI inputs and 148 HDSDI outputs) and two redundant fiber rings around the Wiener Stadthalle. For intercom Riedel also was responsible, and as with any of ORF's big events the Riedel Artist system (15 mainframes with more than 300 panels including also the OBVans) was stretched to its limits. It was controlled via a central workplace at the TOC. Riedel also provided the Walkie-Talkie Radio Network. (550 TETRA radios, 100 Analogue radios, TETRA base stations with repeaters to cover the whole area).

With the Microsoft Azure cloud platform the file sharing between the ORF editorial staff and the delegations was ensured. Via the Yammer application 1,300 international delegates, 800 crew members and 800 volunteers received information via push notification.

Microsoft Azure was also responsible for the worldwide exchange of videos with more than 45 TV channels and the Video on Demand (VOD) Solution. Several terabytes of VOD were streamed from 40 countries to Vienna. Also the official ESC app realized by digame mobile and Appsfactory was hosted via Azure and supplied the fans with all the information on the ESC.

The international signal distribution was carried out under the auspices of the EBU in three ways simultaneously: 2x via uplink (double uplink at the TV Compound) and 1x via fiber to the ORF center with subsequent feeding the two semi-finals and the final into the EBU Network and to all the ESC fans around the world. The final was hosted by Mirjam Weichselbraun, Alice Tumler and Arabella Kiesbauer who were eager to welcome the thousands of people in the arena and the millions of viewers on the TV sets. Austria and the city of Vienna have proven to be worthy hosts of Europe's favorite TV show with a wonderful evening of entertainment put on by host broadcaster ORF.

The show was opened with a spectacular Magic Bridge, with artists welcomed to the stage by none other than last year's winner Conchita performing the official Building Bridges song and it was closed with Måns Zelmerlöw from Sweden winning the 2015 edition of Europe's favorite TV Show with the song Heroes!

Text by: Reinhard Penzel

Photo credits: Ralph Larmann

"The Eurovision Song Contest which undoubtedly is a very unusual production, whether because of the relatively short time for preparation and organization, the very intense and countless hours of work, the exceptionally high technical efforts, the attempt to transfer the many creative and innovative ideas and concepts the best possible way into reality, or even the coordination of a large number of employees - to be seen in retrospect no one would like to miss a single minute of this unique, spectacular, exciting and eventful time. Together with all my ESC colleagues and our partner- and support-companies we were able to bring a great production into reality,"

Claudio Bortoli
Head of Technical Production, reflected on his ESC experience.

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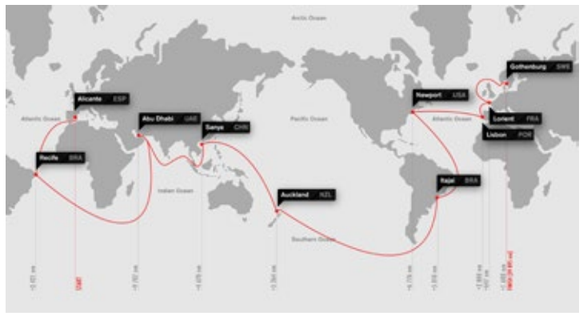
VOLVO OCEAN RACE AND COBHAM SAIL THE SEVEN SEAS

Photo © Amory Ross / Team Alvimedica



The Volvo Ocean Race, the world's longest professional sporting event, is also the most extreme offshore race on the planet. Seven Volvo Ocean 65 boats – a new class of high performance, one-design racing yacht – set sail on 11 October 2014 to begin traversing 38,739 nautical miles, visiting 11 ports and every continent, starting at Volvo Race Headquarters in Alicante, Spain, before crossing the finish line on 22 June 2015 in Gothenburg, Sweden, the home of Volvo, where the 2014-2015 overall ocean race victory was claimed by Abu Dhabi Ocean Racing.

When you take on an around-the-world challenge, you have to be absolutely certain that every piece of supporting technology is reliable and flexible. It's impossible to overestimate the amount of preparation that takes place behind the scenes before such an endeavour. Volvo Ocean Race broadcast coverage requires a three-year cycle of logistical planning and technical decision-making to determine determines precisely what technologies will be used on and offshore, and both must be able to withstand some of the most rigorous and challenging conditions Mother Nature can throw at them, and do it for a long period of time.

Because of the long pre-race preparation cycle, extensive testing, and nine-month duration of the race, technical requirements evolve and ideas for new applications emerge. Some of these new technologies aren't anticipated at the start of the race, but come to be key components that are heavily relied upon as various stages of the race transpire.

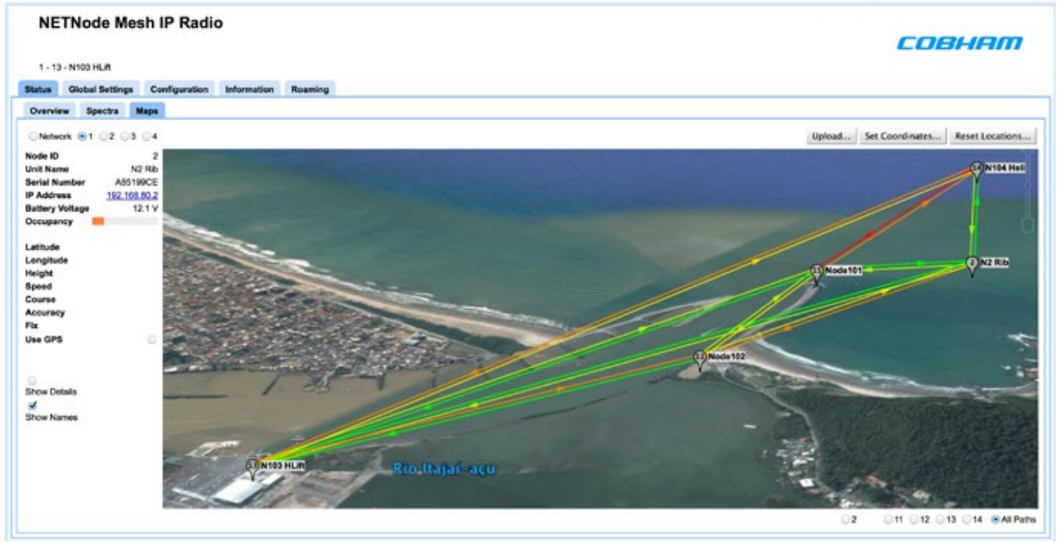
Evolution and innovation have actually been key factors in the race over its 40-plus year history. Race officials and global broadcasters need to keep in touch with an existing fan base of sailing enthusiasts, and share the action with rapidly growing audiences new to the sport. However, for many years it was a difficult race to follow. When it first took shape as an around-the-world challenge in 1973, the only way to share what happened during weeks at sea was for the on-board reporter, laden with the bulky film cameras of the day, to capture on film, and later, tape, what happened during each leg of the race for subsequent processing, editing and distribution once the boats reached port.

Photo © Matt Knighton / Abu Dhabi Ocean Racing

Photo © Abu Dhabi Ocean Racing

Today, each Volvo Ocean 65, in addition to being a state-of-the-art sailing vessel, is also a multi-media machine. Thanks to the very best in RF and satellite technology, race action could be followed with a combination of packages produced by each onboard reporter. The identical Volvo 65 race boats were equipped with miniature studios that integrated a range of custom-made hardware and software applications that transmitted images and information to Volvo Race Control in Alicante, which were subsequently distributed to international broadcasters or shown on the race's dedicated IPTV channel.

Each boat was equipped with five waterproof cameras and multiple microphones, placed starboard, wheel, port wheel, hatchway and bow, plus two uplink points. Three additional uplink points were used to transmit HD images captured by five strategically placed Sony FCB-H11 HD Colour Block Cameras. Central to getting onboard information back to Alicante were two satellite domes, a Cobham SAILOR 250 FleetBroadband and a larger Cobham SAILOR 500 FleetBroadband on each yacht, as well as Cobham's Explorer 710 Class 1 BGAN terminals from land, all of which use Inmarsat's flagship mobile satellite communications network.



The SAILOR 250 sent a data package from each vessel to Race Control every ten seconds, which told them exactly where each boat was, how fast it was going and what the conditions were. The 250 also provided email, weather and media file transfer when conditions were favourable. The SAILOR FleetBroadband 500 was primarily used to transmit live HD pictures, but could take over from the SAILOR 250 in harsh conditions. The SAILOR 500 was also used for live calls, which previously would have been all but impossible. As every boat approached each of the 11 ports, the on-board reporter switched to an "in-shore racing" workflow via a combination of Cobham Solo H.264 transmitters, PRORX receive systems and, eventually, IP Mesh networks, which is where the need for evolution and innovation came into play early on, specifically for leg start shows and, importantly, ever-elusive arrival shows. While leg starts and in-port races offer a format similar to traditional broadcasting formats for live shows, i.e., they start at a precise time and are within a clearly defined race course that can be followed. Arrivals, however, were a different matter.

During the second stopover of the race in Abu Dhabi, around Christmas 2014, it became clear that, even though Estimated Time of Arrival can be roughly calculated, because the boats were manoeuvring through the open sea so much that it was still difficult to know exactly when each one would arrive, or where the technology equipment needs to go to cover it. Even the finish line moves around quite a lot, so there may not be time to get broadcast technologies in place and establish the necessary links.

It was at that point that a better, faster, and easier way to deploy technology, and move data around - ideally over IP - had to be found. VOR looked further into Cobham's range of products and discovered that their IP Mesh system had additional capabilities that could be further exploited in previously unforeseen ways.

Photo © Yann Riou / Dongfeng Race Team

Photo © Anna-Lena Elled / Team SCA

Before Abu Dhabi, the ability to provide content for live arrival shows was pretty limited because there was not enough time to set up an RF infrastructure, let alone a full broadcast compound at each port. VOR started thinking about ways of using Cobham's IP Mesh to not just communicate various forms of telemetry, but also push HD video. Because IP Mesh is extremely versatile, multiple transmitters can be combined into a single IP network, offering genuine non-line of sight coverage and extended range in environments that are usually too difficult for most RF solutions. During the Abu Dhabi stopover, IP Mesh was installed on boat masts (from which they would eventually perform from the middle of nowhere) to Volvo Ocean Race-inspired Volvo cars onshore, to helicopters, chase boats and the like. IP Mesh was pushed hard, right to, and beyond, the perceived limitations of next level IP-based connectivity and production, and performed flawlessly.

The initiative taken with IP Mesh in Abu Dhabi paid off with the next arrivals show in Sanya, China, where VOR upscaled the live arrivals coverage. For the first time, a wide range of very solid RF links could be used, and all at an extremely low cost. With IP Mesh all VOR had to do was connect a link from any suitably equipped camera to the IP Mesh. This meant was that VOR's wireless network, and those who were using it, no longer had to remain static to ensure connectivity. Unlike other wireless systems, IP Mesh constantly readjusts itself, working out which of its moving nodes were in range to find the best route to exchange data between them.

IP Mesh was easy to deploy because each unit is very small. Plus, it's omni-directional, so there's no need to worry about what direction to face, which may seem a minor point but is actually a significant benefit. Basically, the deployment of IP Mesh meant that the VOR production team could move right along as the motions of the fleet dictated and keep covering them, uninterrupted, with great pictures to tell their stories. Another innovation involving IP Mesh became apparent when the VOR production team discovered that industry-standard 3G/4G backpacks work very well when inland in a country with well-established network coverage. But in world regions with less-established coverage – you can pretty much forget about 4G or 3G connectivity. This prompted VOR to develop a hybrid backpack approach by adding an IP Mesh unit to each one. Subsequently, whenever there was no 3G or 4G coverage, IP Mesh took over.

Photo © Matt Knighton / Abu Dhabi Ocean Racing

The combination of 3G, 4G, and IP Mesh enabled VOR to achieve very long-range, high-quality coverage of the arrivals with an extremely flexible system that could be deployed in record time. A very good example of this is the 24-hour stopover in The Hague, the penultimate stopover before finishing the race in Gothenburg, Sweden.

VOR was simultaneously finishing operations at the previous stop in Lorient, France, while covering live arrivals in The Hague and prepping for the finish in Gothenburg. Teams were working in three locations at once, but by using the IP Mesh-centred hybrid system, they were able to derig-, relocate and deploy proper broadcast infrastructures in about 12 hours, which covered them for all three locations, including the biggest and most important arrivals show of the race, the finish line in Gothenburg, where VOR produced an eight-hour show that covered the fleet all the way from the coast of Denmark to Sweden.

Photo © Brian Carlin / Team Vestas Wind

The Volvo Ocean Race is one of very few truly global sporting events, and the technologies used are tested to the extreme in very challenging environments. From Spain to the UAE, China, New Zealand, Brazil, Sweden and the rest, VOR and Cobham were challenged, and like Abu Dhabi Ocean Racing, not only met those challenges, but triumphed.

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PRODUCTION FOR TELEVISION

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LIVE
PORTRAIT

OB Vans
Mobile Production

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Switching power in new Telerecord truck

Telerecord, based in Florence, Italy, is one of Europe's leading providers of outside broadcast facilities. When it won a major new contract in the autumn of 2014, to start at the beginning of 2015, it had to build a very large vehicle very quickly.
The result was Unit 26, a triple-expanding trailer designed to provide comprehensive production facilities for the largest sports and music events. The newly constructed vehicle is capable of expanding to 5.35m wide when on site, providing plenty of space for the production team.
For sports, a large number of slo-mo and replay desks are provided, as well as space for multiple graphics operators. The truck is designed to support up to 24 Sony cameras, including HDC3300 super slo-mo cameras. Alternatively, for non-sports events it can handle 10 Sony F55 high resolution digital cinematography cameras.
Telerecord has traditionally built its own outside broadcast units. The company's engineers work with local coachbuilders to get the vehicle and its core facilities – like heating and air conditioning – right, before they design and install all the technical equipment. Drawing on its experience with other vehicles in the fleet, Telerecord set out to build their largest unit in a very tight timescale.
The unit was rolled out in time for its first job. On 1 January 2015, Unit 26 started a three-month contract to provide host broadcast facilities for the International Bobsleigh and Skeleton Federation's World Cup. From Altenberg in Germany, the competitors – and Unit 26 – visited winter sports resorts around Europe.

Imagine switching

As part of the system design, Telerecord chose a 354 x 560 multi-format Platinum IP3 router from Imagine Communications. This was the first time the company had selected the IP3, and in part its choice was because it represented the most modern and most forward-looking product on the market. The router is expandable up to 500 x 1000 without taking additional rack space. It also provided a lot of built-in functionality that other solutions would have required in external devices. That would take up extra space and power in the tight confines of an outside broadcast truck, so this is a real benefit. "On the bobsleigh and skeleton coverage we have a lot of remote cameras," explained Giovanni Lorini, technical manager of Telerecord. "Cameras embedded in the track, for example. You have the same thing in other sports, like goalmouth cameras in football. "The Platinum IP3 router gives us not just frame synchronisation on the input, but the ability to control luminance levels and chroma," he said. "It makes it simple for us to bring in specialist cameras, and make them available anywhere they are needed."

Audio

Comprehensive audio functionality was another requirement for the switcher. Designing for an outside broadcast unit means you have to build in flexibility, but at the same time you have to be conscious of adding further equipment which takes up rack space, uses power and adds weight to a vehicle which is likely to be close to the legal limit. Unit 26 is right on that limit at 45 tonnes. The Platinum IP3 router includes the ability to embed and de-embed audio, and to combine multiple audio feeds where necessary. The production servers in the truck, for example, are configured with 16 audio channels, so there will be times when separate audio tracks for multiple languages will be recorded, or the discrete and Dolby surround sound mixes. Another trick that Telerecord has used to save weight and reduce complexity is that the connection between the Platinum IP3 and the Calrec mixer in the audio area is over Multichannel Audio Digital Interface (MADI). For events with large numbers of microphones, like concerts, the Madi can be extended out to stage boxes. According to Lorini, it makes the connections easy. "We have complete flexibility of audio in and out," he said. "This way is very simple."

In operation

Telerecord likes the fact that the Platinum IP3 router is extremely resilient. "We have configured it with full redundancy of crosspoints in audio and video," said Lorini. He also pointed to the ability to clean switch when required. This allows the router to handle multiple additional outputs without taking up production switcher resources. "Overall, the Platinum IP3 provides a lot of functionality we cannot find anywhere else," he said. "This is the most complete solution available today."

With the bobsleigh and skeleton tour finished, Unit 26 is handling some other major sports events, before providing the production platform for rock concerts and other entertainment shows during the summer. One of the challenges of a general purpose outside broadcast unit is the need to re-configure the layout and operations quickly to suit each task. With multiple production areas, monitor walls have to be set up for each project. The router is at the heart of this, putting signals where they are required. As well as standalone monitors, there are around 65 quad split displays on the truck. Once a complex set-up is established for monitoring, it is stored by the engineer in charge. That configuration can be instantly recalled in the Platinum router at any time in the future, when next the truck is working on that sort of project or with a specific director, etc. One of the set-ups which will be important to Unit 26 is the ability to gang four channels together, to support 4k from the Sony F55 cameras. The company sees 4k production as being a likely requirement, particularly for major music events.

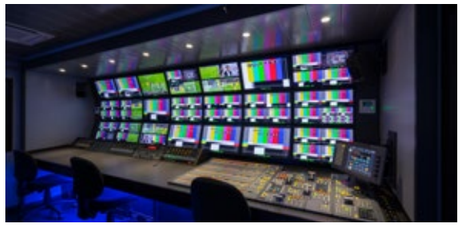
Looking to the future

One of the features which makes the Platinum IP3 router unique is that as well as switching video and audio, it is also capable of switching IP streams on COTS platforms under the Magellan SDN Orchestrator control system in exactly the same manner. At present Telerecord is not using the IP functionality, but expects that its transition will start soon – "maybe within the next year," according to Lorini. The company has almost 40 years' experience in leading the way in remote production, technically and creatively. It was a pioneer in digital technology (in 1994), in HD and in 3D. Unit 26 represents the state of the art today, and is ready to deliver against new technological demands in the future.

Imagine COMMUNICATIONS

Sound Area

Production Area 2

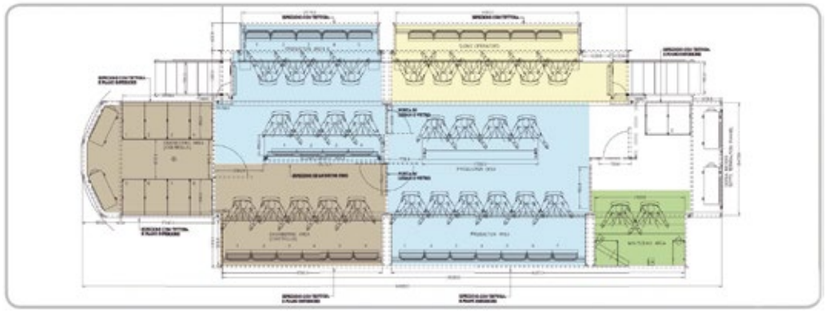


Vision Control

Production Area 1

SloMo Area

Equipment Rack



Engineering Area
SLOMO Area
Production Area
Audio Area

TECHNICAL SYNOPSIS

UNIT26HD

OB Van

Video

20x Sony HDC-1500/2500
04x Sony HDC-3300
10x Sony PMW-F55
Monitors Vision Area: 7x Ikegami 17", 7x Vutrix 19" Quad,
Lenses from Canon and Fujinon, all Focal Lengths available
Tripods from Vinten and Cartoni
Production Area 1
Vision Mixer: Sony MVS-8000X HD/3G/4K 8ME, 4DME
Monitor Wall: 21x Vutrix 24" Quad, 3x Vutrix 17" Quad
Production Area 2
Sony MVS-8000X satellite ME
Monitor Wall: 10x Vutrix 24" Quad
8x VRT positions: Sony XDCAM
8x EVS LSM XT3 6ch Servers
Monitors SloMo: 12x Vutrix 24" Quad
Digital Glue from AJA and Imagine Communications
Patch: Argosy with 896 Patch Points
Video Matrix: Imagine Platinum IP3 354x560
Video Measurement: Tektonix WVR 7200

Sound

Audio Mixer: Calrec Artemis, 340 ch, 64 tracks
Backup Mixer: Yamaha 01v96
Audio Router: Imagine Platinum IP3 192x192
Madi, 120x120 AES
2x DP571, 2xDP572, 1xDP570
Monitoring: Videotek ASM100, Dolby LM100
Monitor Wall: 4x Vutrix 17" Quad

Intercom

Matrix: Clear-Com Eclipse 112x112
Wireless Talkback Equipment: Motorola
GM360, GP340
ISDN Codec: 2x Glensound GS1U050
Commentator Box: 2x Glensound GDC-6432

Coach Built

Length: 16,5m
Width stowed: 2,5m
Width expanded: 5,35m
Height: 3,97m
Weight: 45t

ORCHESTRE NATIONAL DE LILLE: CARMINA BURANA AND RAVEL'S BOLERO

A live concert event to mark the orchestra's 40th anniversary

To celebrate its 40 years anniversary, the Lille National Orchestra (ONL) performed a concert for the first time in the Pierre Mauroy stadium on July 17: An exceptional event in the temple of Lille OSC in front of more than 15,000 spectators. The concert was picked up by by 62 microphones and 11 cameras.

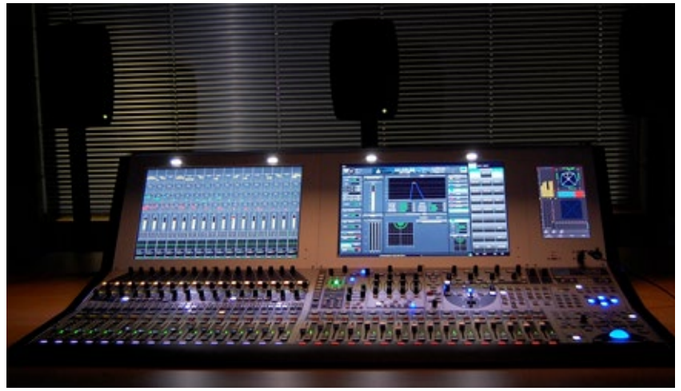
Conductor Jean- Claude Casadesus led the 100 musicians of the ONL, accompanied by 200 choristers of the Nord - Pas de Calais and the city of Reims, and three international singers: soprano Yeree Suh, the tenor Jakob Huppmann and baritone Ales Jenis, conducted two great works: Maurice Ravel's Bolero and Carmina Burana by Carl Orff, a program introduced by the fanfare to precede Peri Paul Dukas.

The ONL was established with the backing of the Nord-Pas de Calais region and state support in 1976, and since that date has pursued an ambitious artistic outreach policy, on the initiative of Jean-Claude Casadesus. Its aims are to make the repertoire better known, foster new music (particularly by appointing composers-in-residence, such as this season's Bruno Mantovani, the 2009 Victoires de la Musique Classique's "composer of the year"), promote fresh talent, and educational and youth projects. International conductors and soloists are invited by the orchestra's director to collaborate in what he defines as "taking music to everywhere it can go".

Over a period of fourty years, the Orchestre National de Lille has thus established itself as no less than an ambassador for the region and for French culture, whether at home in France, abroad or in the nearly two hundred local authorities that make up the Nord-Pas de Calais region and which, in a model example of decentralisation, it sustains musically. The orchestra's work has taken it to four continents and more than thirty countries.

After China (2007 and the 2010 World Exposition in Shanghai) and a triumphant tour in Austria, Slovenia and Croatia (2009), the orchestra and Jean-Claude Casadesus toured in Russia (five concerts) as part of the France-Russia year in 2010. In September 2013 they give their first concerts in Kazakhstan (in Almaty and Astana).

orchestre national de lille
jean-claude casadesus
région nord-pas de calais



ONL: Europe's first orchestra to go fully digital

The renowned ONL under conductor Jean-Claude Casadesus has become Europe's first orchestra to go fully digital. With a recent investment in a Sennheiser and Neumann microphone set-up, the orchestra now boasts a fully digital signal chain from sound pick-up to recording. Their mobile studio comprises a total of 33 digital Neumann microphones, 24 digital Sennheiser microphones, all on active stands and booms, and six DMI-8 interfaces. Also included in the studio are a Lawo mc 56 audio mixer, a 6-channel Sennheiser wireless system and a full Neumann monitoring set-up. Managing Director François Bou, who feels people have become overly concerned with the visual aspects of performance, sees the new system capturing the ears of his audiences, taking them on a deeper, immersive journey into the richness and variety of the music.

"For us, the fully digital mobile studio is like a new instrument in the orchestra. It allows completely new aesthetics in our work," explains François Bou. "We are playing classical music but this does not mean that we are an orchestra of yesteryear. Deeply rooted in both classical and contemporary music, the ONL rather is a high-tech orchestra that moves with the times and is present with its audiences in their specific environments and media."

An example in case are the ONL's successful "ciné-concerts" – film showings with live orchestra music – and the "concerts flash"; held between 12.30 to 13.15 these concerts attract (amongst others) Lille's city workers during their lunch hours. "The concerts flash are enjoying an unprecedented success – for the last lunchtime chamber music concert, we welcomed more than 1,000 guests."

The digital mics are also used for the ONL's "cine-concerts", film showings with live orchestra music (conductor: Ludwig Wicki)

Future ventures include a musical cooperation with a major video game company and an educational TV programme for children and families, "Piccolo Saxo", which has started this April. "Our mobile studio will be a great asset in both recordings. There will be broadcasts on the France 3 regional channel, and also live streams of ONL concerts on digital platforms – this will increase the presence and reputation of the orchestra still further, and take their music to new audiences."

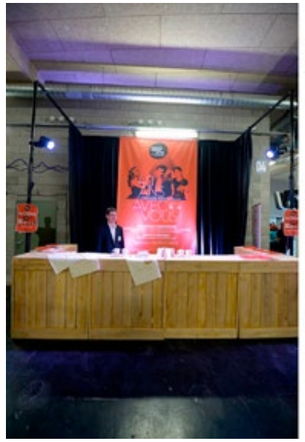
An exceptional venue for an exceptional orchestra

The orchestra's home is "Le Nouveau Siècle" in Lille, a venue that was fully renovated and re-opened in 2013 and boasts a residual noise floor of an incredible 20 dB(A) only. The place is famed for its exceptional acoustics, and is a haven of creativity and creation. It therefore comes as little surprise that the venue is often rented to other ensembles and orchestras – and its attractiveness will further increase with the new mixing and recording possibilities.

Stéphane Evrard, Technical Manager of the ONL, and his sound team are enthused by the new microphones: "Since we have the digital mics, we have had ensembles coming out of the Nouveau Siècle saying how thrilled they were and that they had never heard themselves in such a way."

The renowned Lille National Orchestra (ONL) under conductor Jean-Claude Casadesus has become Europe's first orchestra to go fully digital

Frédéric Blanc-Garin, who works as a freelance sound engineer in Stéphane Evrard's team, adds: "You really forget that there are microphones in between you and the orchestra. If I am asked to compare analogue with digital microphones I would say that using an analogue microphone is very much like using a magnifying glass. The instrument you look at gets bigger but at the edges, the image is slightly blurred, slightly out of focus. Digital microphones, on the other hand, take the whole audience closer to the orchestra.



Conductor Claude Casadesus with soprano Yeree Suh, the tenor Jakob Huppmann and baritone Ales Jenis after the 40th anniversary concert

"I'm currently touring with a band and also use digital microphones with them, and after the shows, people have come up to me and said, 'Wow that was magic! It really felt as if I could touch the instruments, there was nothing in between me and the band!"

Besides recordings, the studio equipment is used for amplified or partly amplified concerts such as the cine-concerts and outdoor concerts, and is also a valuable creative tool for resident composers at work. "At the mixing desk, a composer can immediately try out how the music will sound, try its spatiality, even record a tape and see how individual elements should ideally be recreated," says François Bou. François Bou sees yet another important aspect: "With the digital microphones – and our digital Neumann monitoring loudspeakers the source is completely pure and unadulterated, and our musicians use the recorded sound to evaluate, control and perfect their playing. The studio has become an important tool in rehearsing, too." The monitoring set-up consists of five Neumann KH 310 D three-way speakers and a KH 810 studio subwoofer.

Frédéric Blanc-Garin explains the various mixes achieved with the digital equipment: "For each task, we have the right mic set-up at hand. For any large event, for example the in July 2015, we made use of our full complement of digital microphones. If we work with a French radio station, we have a much smaller set-up with their favourite mics in place – we use several TLM 103s in this case. If none of these mixes 'apply', then there's the basic mix we do for our system for the hearing impaired, with an efficient stereo pair set-up."

"We even have our own Sennheiser wireless microphone system, a 2000 Series system, which we mainly use for producing our educational material. When we are miking solo vocalists, we rent a Sennheiser Digital 9000 system to ensure the utmost in sound quality."

The strings are picked up by four Sennheiser MKH 8090 wide cardioids, digitised by the attached MZD 8000 converters, and by four Neumann KMD 143 wide cardioids, which are also used for the bass section of the orchestra (again four models). The woodwinds are covered by a total of five cardioid MKH 8040 stereo sets, i.e. matched pairs. The brass is miked by four Neumann D-01 double-diaphragm mics and a Neumann KM 185 D stereo set (hyper-cardioid), while the horns are picked up by two MKH 8090. The percussion section boasts two Neumann KM 185 D stereo sets, four Neumann KMD 143 and a Sennheiser MKH 8020 stereo set (omni). The harp is picked up by a Neumann KMD 145 (cardioid), the celesta by two Sennheiser MKH 8090s. Soloists will be picked up by two MKH 8090s, and an MKH 8040 stereo set, while choirs are miked by three large-diaphragm TLM 103 D (cardioid). Further Neumann mics in use are two KMD 131s (omni), a KM 184 D (cardioid), and a KMD 120 (figure-of-eight).

Summing up, François Bou says, "The digital studio is a powerful tool for the orchestra, which also opens up new and powerful means of distribution. The sound is just amazing in its purity and directness, and workflow-wise, we can keep everything in the digital realm, from instrument pick-up to mastering."

Photo credits: Ugo Ponte / o.n.l.

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OSTANKINO
TELEVISION CENTER

THE TELEVISION CENTER OSTANKINO

LIVE PORTRAIT

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Television center Ostankino has been the biggest broadcasting center in Europe for more than 45 years.

Modern equipment from world's leading producers and qualified specialists provide technological platform for creation and expansion of content by Russian's leading tele- and radio companies. Television center Ostankino includes studios, over-the-air and assembly equipment rooms, complexes for making decorations and maintenance of production processes. More than 15 thousand people attend television center daily. «Channel One», «NTV», «NTV+», «Public television of Russia», «Star», «Carousel», television companies «VID», «Red square », «AMIK», «Red Media», «PLAY», «State tele- and radio fund» and dozens media companies are the constant partners and clients of the television center. In their disposal they have more than 20 studios with an area from 60 to 1000 square meters, assembling and sound equipment room, outside-broadcast complex and so on.

The main activity of the Television center Ostankino is focused in four technological complexes:

- broadcasting
- complex of the TV production
- telecommunicating
- complex of art-decorating

Television center`s broadcasting complex allows to form continuously the TV content with the help of modern digital video servers, mounting systems, storage infrastructure and to broadcast programs according to Russian time-zones non-stop.

TV production complex owns modern technical base to create television content of any format: informational, journalistic, artistic, musical programs, video clips and films. Complex provides professionally equipped studious of standard and high definition formats with controlled system of special lightening, moving television stations to work out-of-studio, video mounting and graphics hardware, mounting studios with multi-channel sound technology and other technical means for implementation of the process of TV production.

Telecommunicating complex provides continuous signals in internal connection lines of the television center Ostankino, and output on the necessary distribution networks on urban, intercity and international communication channels.

Art-decoration complex allows to create decorations of any difficulty for the preparation of studio and out-of-building TV programs` recordings, to make functional technological furniture for studious, equipment and director`s rooms. This complex also offers various costumes and props for the creation of authentic images during different programs, theatre plays and films.

Television technology center Ostankino was put into operation on the 4th of November, 1967. In three days, on the 7th of November, on the 50th anniversary of The October revolution, the first color television broadcast of the parade on the Red Square in Moscow was held.

The ceremonial laying of the main building, studio complex No. 1 on Akademika Koroleva Street, house 12, was held on the 22th of April, 1964. The chief architect was L.I.Batalov, and chief engineers of the project were – V.B.Renard and S.O.Guirshgorn. Telecenter Ostankino has had to become the most progressive technology centre in Russia, also as an architectural building.

The studio complex No. 3 on Akademika Koroleva Street, 19, was built in 1980 under the guidance of A.M.Melberg by the beginning of the Olympic Games held in Moscow. Total area of two buildings is 210 477 square meters.

In the beginning of 2015 the new 27th studio was opened.

The new studio complex, working in the HD format is situated on Akademika Koroleva Street, 19. It consists of film pavilion, with the area of 600 square meters which accommodates 100 viewers, and three equipment rooms.

While developing lightening system, the configuration of suspension and distance light control was firstly implemented. It helps to get various staged solutions.

CONTENTS

By Laurent Renard, CEO of I-MOVIX

It's the Cup Final and a goal has just been scored. The producer rolls the slow motion replay and as the ball comes to the goal scorer, zooms in on the player and freezes the frame while the experts make their comments. Then the replay rolls on, the camera zooms out again to show the melee of players in front of the goal, but as the keeper dives to make a save, the shot closes in again to show the fingertip contact before the ball finally hits the net.

SPORTS PRODUCERS ARE RACING TO GO ULTRA-SLOW

The images are all rock-solid, perfect and with no sign of motion blur. Welcome to the world of 4K zoom.

Replay sequences like this with after-the-shot zooms and changes in the replay speed have become a highly sought-after enhancement to premium productions in the top sporting events. Football, auto racing, baseball, athletics and many other sports are now being seen in greater detail and higher quality with this technique. Shooting 4K for HD output allows production teams to apply post-action pans and zooms to the replay to focus on points of interest that the cameraman could not have anticipated and captured in the same way while shooting live. With cameras capable of capturing frame rates of up to 1,000 fps in 4K, the ultra-motion replays the viewer sees at home in HD are crystal clear like the rest of the footage. The recent Emir of Qatar Cup final was an opportunity for host broadcaster Al Kass to assemble the most advanced production tools and trial them. The 4K zoom capability was provided by I-MOVIX's X10 UHD system, which Al Kass used together with twin I-MOVIX X10 USM HD systems to handle the rest of the ultra slow motion replay requirement.

It may have been 45 degrees out on the pitch – too hot for most people even to watch comfortably, let alone play – but for Al Kass production team it was no sweat to take on the new 4K system. The workflow and broadcast integration for the X10 UHD is exactly the same as for the broadcaster's in-house X10 USM HD systems. This familiarity meant that camera and production staff could get to work without any customised integration or learning curve at all – an important advantage in a tightly-scheduled, large-scale production. For the Emir Cup, Al Kass deployed 36 cameras in total – the same number as in the most recent World Cup final – of which three were I-MOVIX ultra motion systems.

The team chose to use the X10 UHD at 350fps to achieve the required quality of playback while keeping the replays short enough to fit into the overall balance of coverage. With the X10 UHD higher frame rates are possible, up to 1000fps in 4K, but the length of time needed to replay clips shot at these rates does not suit the rapid pace of some sports such as football. But when shooting in 4K for HD and using the clips for 4K zoom, it's vital to avoid motion blur, so frame rates need to be at least 120fps.

Although the match kick-off was at 7pm, with the stadium lights coming on only for the last few minutes of play, the X10 systems had enough natural light to be able to produce exceptional images. The systems used at the Emir Cup had been updated with the latest software which provides increased light sensitivity and other picture quality enhancements, but for events shot at night under artificial light, there is an optional d-flicker system for the cameras to guarantee flicker-free replays in less than ideal conditions.

4K zoom has been an in-demand technique for a couple of years but the latest development of it – the use of freeze frames within the replay – is a recent trend, and it looks like becoming a must-have feature of top-level sports coverage. Commentary teams in particular like the ability to stop the replay at a certain point, zoom in and discuss a detail of the action before continuing the replay.

But such is the popularity of ultra-motion replays that it is being used to cover a rapidly widening range of sports. Another recent event highlights a different challenge for producers wanting to build ultra-slow motion replays into their coverage, and showcases another capability of the I-MOVIX range.

The Grand Steeple-Chase de Paris is one of the world's great horse racing events, and for the 2015 edition broadcast service provider AMP Visual TV decided to enhance the coverage by adding ultra-motion replays to the mix of tools available to the producers. Ultra-motion sequences from sports involving horses and jumps are particularly spectacular, with details like the horse's musculature and flying debris from the fences becoming visible in a way that is missed in footage at normal speeds. But whereas for a show-jumping event these details can be captured with static cameras, a steeplechase over a course with 23 obstacles spread over 6 kilometres demands moving cameras.

To shoot ultra-slow motion sequences from vehicle mounted travelling at the same speed as the horses, AMP Visual TV used an I-MOVIX X10 UHD RF camera system, shooting at 800fps in HD 1080i mode to achieve the required level of detail and insight in the replays.

Like the Emir Cup, covering the Grand Steeple-Chase de Paris is a large-scale production for AMP Visual TV, involving four mobile units and more than seventy operators. One of the mobile units was dedicated to the RF operation, with the I-MOVIX system's camera interface located on the roof of the truck, where it could receive the signals arriving from the camera several kilometres away.

Laurent Renard, CEO I-MOVIX

The camera interface is linked directly to the camera control unit inside the truck by a hybrid fibre cable. Here the jog panel and camera control panel allow the operational team to shoot and playout the ultra-slow motion clips. The two-way RF link between camera and truck allows both the reception of the images, and the data transmission to operate the camera itself.

In one sense, coverage of premium sports events is a race in itself, with broadcasters and production companies vying with each other to lead the way in quality, novelty and the comprehensiveness of their package. Ultra-motion has become one of the most sought-after additions to the toolkit and the pressure to innovate means that production teams are always looking for new ways to use it. Both the Emir Cup and the Grand Steeple-Chase de Paris demonstrate that ultra-motion is a flexible addition to the producer's palette, with the ability to bring to the audience an expanding variety of insights and interpretations of the action. There is no end in sight to this pressure for innovation, and this year will see the introduction of further possibilities for the diversification and growth of ultra-motion as a key component in high-quality sports coverage.

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BAYERISCHER RUNDFUNK

LIVE PORTRAIT

OB Vans

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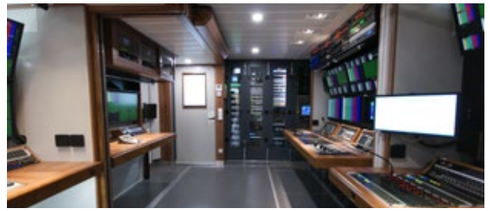
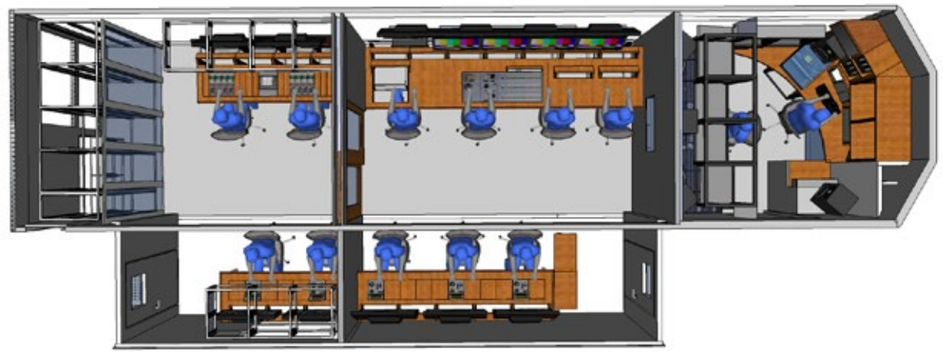
Bayerischer Rundfunk, BR for short, is Bavaria's public broadcasting service with more than six million viewers and listeners daily in Germany's largest state.

With ten radio and two television programs, two internationally renowned orchestras, a celebrated chorus, and more than three thousand professionals, BR is one of Europe's most respected broadcast institutions.
BR makes a significant contribution to the ARD network which consists of nine regional public broadcasters and the external service Deutsche Welle. In addition, BR provides a broad range of exceptional productions for the five nationwide public TV channels: Das Erste, ARTE, 3sat, KI.KA, PHOENIX.
BR operates a main broadcasting facility in downtown Munich as well as studios in Munich's northern Freimann quarter and the nearby municipality of Unterföhring. There are also regional TV and radio studios e.g. in Nuremberg ("Studio Franconia"), Würzburg ("Regional Studio Franconia/River Main") and Regensburg ("Regional Studio East Bavaria").

BR is in part funded by commercial activity, including the limited sale of on-air commercial advertising time; however, its principal source of income is the revenue derived from viewer and listener licence fees. As of 2015 the monthly fee due from each household for radio and television reception was €17.50: the equivalent of €0.58 per day, payable quarterly, half-yearly, or annually. These fees are collected not directly by BR but by ARD ZDF Deutschlandradio Beitragsservice, joint agency of Germany`s public broadcasting services.
In 2014 BR derived 88.1% of its income from viewer and listener licence fees, 9.9% from other sources such as product licensing and investments, and 2.0% from the sale of advertising time. 45.1% of this income was spent on programme production costs, 29.7% on staffing, and 25.2% on other operating expenses and fixed charges.
In 2010 BR started to upgrade its SD infrastructure to HD. BR replaced its FÜ1 followed by its FÜ3 and a first TV production studio in Unterföhring. In 2011 FÜ1 was the main production unit for the coverage of the European Song Contest in Düsseldorf.
In November 2013 BR awarded the System Integrator Broadcast Solutions GmbH to replace the SD OBVan FÜ2 with a new HD OBVan. It was the first project which was awarded by BR to Broadcast Solutions. The task was to deliver a tailor-made solution within a short delivery time to the highest engineering standards.





Vision Mixer

Vision Control

Sound Area

SloMo Area

Production Area

TECHNICAL SYNOPSIS

FÜ2

OB Van

Video

- 8x Sony HDC-1400 cameras
- Lenses from Fujinon
- Vision Mixer Sony MVS-7000X
- Monitor Wall with VTS TFTs and Sony PVMs
- Evertz Multiviewer VIPX-6867
- 3x EVS XT3
- Digital Glue: Lynx 5000 Series, Lawo V__pro 8
- System Controller: L-S-B VSM
- Video Matrix: Evertz EXQ 576 x 576
- Sync and Measurement: Tektronix SPG-8000 and WFM-5250

Audio

- Audio Mixer: Lawo mc²66
- Audio Matrix: Lawo Core with Dallis Frames
- Monitoring: Geithain RL903K
- Microphones: Sennheiser
- Measurement: RTW TM-7 and TM-3

Intercom

- Matrix: Riedel Artist 128 x 128
- Wireless Talk-Back: Motorola
- ISDN Codec: Mayah Centauri 3000

Coach Built

- Weight: 32,5t
- Length: 13,65m
- Height: 4,0m
- Width (stowed): 2,55m
- Width (expanded): 3,9m
- System Integration: Broadcast Solutions

broadcast SOLUTIONS

Broadcast Solutions – system integration and beyond.

Broadcast Solutions is one of Europe's biggest and fastest growing system integrators as well as OB Van manufacturers. For more than ten years the German-based company stands for innovation and engineering „Made in Germany" in the business fields of OB-Vans, DSNGs and ENGs. Furthermore Broadcast Solutions plans, implements and realises projects in the areas of Satcom, fixed Studio and MCR installations, sport arena multimedia solutions as well as mobile Surveillance units. Over the years the company successfully delivered over 300 outside broadcasting units in every conceivable variant, from small radio cars to 24-camera HD outside broadcasting trucks. Additionally Broadcast Solutions planned, implemented and commissioned broadcast facilities, fixed up-and-downlink stations as well as Satcom on the Move solutions. Broadcast Solutions operates from subsidiaries in Europe, Asia and the Middle East. With more than 100 employees worldwide and working as a hardware independent system integrator Broadcast Solutions offers its customers tailor-made solutions – from layout to implementation.

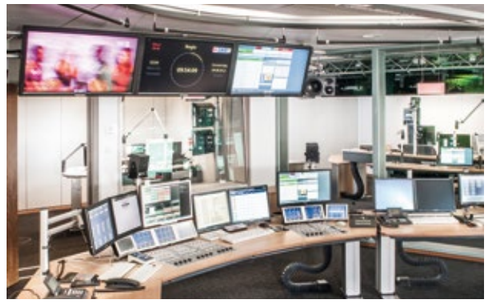
Broadcast Solutions is transferring its experience in the broadcast industry to other demanding business areas such as Arena Multimedia Infrastructure or Mobile Surveillance Solutions. Broadcast Solutions is a competent partner for all technology in the fields of broadcasting, multimedia, infrastructure, engineering or consultancy – video, audio, IP, control systems, digital signage, IPTV, satellite communications and innovative coach building, to name just a few.

A further emphasis of the company is to consult the customers when it comes to workflow optimization, trainings and production consultancy. The close relationship to the customers and our wide experience in building OB vehicles led to the development of the Streamline product family of OB Vans. Streamline OBs are offered in five different versions – pre-engineered, with short delivery times and significant cost savings. Although the Streamline products are pre-engineered, they offer high-standard technology when it comes to coach-building, broadcast hardware as well as workspace solutions and impress with state-of the-art technology. Thanks to the Broadcast Solutions team of experts and years of experience in building OB's, Streamline OB's can be delivered in the shortest time. The overall design of the Streamline OB's with pre-engineered vehicles and optimized hardware combinations are a major part of the solution. The result is a nearly "off the shelf" OB with maximum reliability and without compromise in quality and durability but with significant cost savings.

Broadcast Solutions - history

It all started in 2003 with the formation of the company in Bingen (Germany) and the commissioning of a SNG with supporting vehicle for Ajara TV, Georgia. Over the years the company constantly grew with projects all over the world. A first milestone was the assignment to build an HD OB Van for South Korean SBS in 2005– the first HD vehicle built by the company. Major important projects for the company include for instance the supply of two OB Vans (MP4 and MP5) for German public broadcaster ZDF or an OB Van for HD Broadcast. In the year 2011 Broadcast Solutions realised some very demanding projects in terms of construction time and scope. In a short period of time the company built an HD OB Van for KBS in South Korea, which can be equipped with up to 16 cameras. Due to the tight delivery schedule, the OB Van was delivered to the customer using Anthonov air freight. In the same year Broadcast Solutions delivered seven DSNG's, six OB Vans, a mobile master control room and a flight case production kit to ANO Sports Broadcasting. All of these were used during the Winter Olympic Games 2014 in Sochi/Russia. The company's success story moved on with major studio projects for Mediatec AS, Oslo, broadcast and multimedia installations for Spartak Moscow Stadium as well as the football Stadium in Tashkent.

Broadcast Solutions offer German engineering to international standards thus giving the customers peace of mind when it comes to mission critical environments. Serving as a manufacturer independent system integrator, Broadcast Solutions serves as a single source giving the customers the freedom to choose the best technology available in the market. In close relationship with customers Broadcast Solutions develops individual solutions – tailored to their specific needs and requirements.
Crucial to all the work is the responsibility to guide the customers before, during and after the project phase. Broadcast Solutions experience, creativity and dedication lead to successful, timesaving and future-proof investments.



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IMPRESSIVE 28th SEA GAMES IN SINGAPORE

The 2015 Southeast Asian Games was a Southeast Asian multi-sport event hosted by the city-state of Singapore. It was the fourth time the country had hosted the games and the first time since 1993. The games were held from 5 to 16 June 2015, although several events had commenced from 29 May 2015. About 4370 athletes from 11 participated nations competed in the Games, with 402 events in 36 sports featured in the Games.

HBS, working in collaboration with Host Broadcaster MediaCorp as HB Production Partner, had the objective of delivering an international standard broadcast in order to raise the profile of the Games and the response from Rights Holding Broadcasters (RHBs) confirmed a 'best ever' coverage had been achieved. "The scope was both very simple and very ambitious: make sure that the 28th SEA Games would become the new landmark for sports events in South East Asia by delivering the best coverage ever," explained Project Director Daniel Wlochovski. "By doing just that, we contributed to the celebration of the 50th anniversary of Singapore's independence by producing the memorable sporting event the jubilee deserved. Thanks to the close cooperation we forged with MediaCorp, and greatly helped by the magnificent sports facilities operated by Sport Singapore, I trust that we reached our target to the satisfaction of all the stakeholders."

Photo © Louise Stickland

First-ever Multisport MULTICAM Second-Screen Experience in Singapore

SINGSOC, the Organisers of the Singapore SEA Games, partnered with EVS and to deliver an end-to-end multimedia production service for the multisport event. The service included a cloud based second-screen delivery platform for multimedia content distributed to mobile devices. During the games viewers were able to watch live games and near-live multicam clips from the new Sea Games app, supporting Android and iOS smartphones and tablets. Developed in partnership with NETCO SPORTS, the app featured content from all 36 sports at the SEA Games, including swimming, boxing, rugby, cycling and table tennis, to name just a few. This was the first time such an extensive multimedia delivery platform had been built for a major multi-sport event with the multicam experience. "Making the games accessible to as many people as possible has always been a priority for SINGSOC. Tremendous effort has gone into making sure that the 28th SEA Games in Singapore achieved this by charting new grounds to deliver and enhance fan experiences through its digital offerings. It was very exciting to see how the public reacted being able to watch and interact with the SEA Games in an entirely new and immersive way through digital devices," said Mr Lim Teck Yin, SINGSOC chairman. "The growth in our social fan base and digital traffic was very encouraging. We keep them updated and excited about the Games, no matter where they were and when they went live".

This second screen app was a new addition to the SEA Games' digital arsenal and was the first interactive multi-camera coverage app developed for a multi-sport competition. "When planning an event like the SEA Games, preparation time always seems short and the speed required by facilities always is high," said Thomas Lim, head of the Information Operations Centre, SINGSOC, "the decision to engage EVS technology into our broadcast facilities helped us alleviate those issues and to concentrate on new innovations. When we planned on building a multimedia platform for the games, we knew EVS' involvement would be vital." And he continued, "We were trying to give an all-round experience to all the digital spectators - as we call them. If you decided to have a very engaging digital experience, there was the second screen app."

Nearly 500 Robe BMFLs Help 2015 SEA Games Opening Ceremony Rock!

Nearly 500 Robe BMFL moving lights were right at the core of an amazing lighting scheme designed by LD Mac Chan for the vibrant Opening Ceremony of the 2015 South East Asia Games in Singapore. The glittering spectacle staged in the new 55,000 capacity National Stadium was broadcast live on national TV and across south East Asia, reaching an estimated audience of 600 million plus, and saw the 28th SEA Games declared open in great style. It also featured the greatest number of Robe BMFLs – to date – used on a single event.

The BMFLs represent a massive investment made by Singapore based rental company Showtec Communications Pte Ltd., which purchased over 700 BMFL fixtures, most of them especially for the event, once Mac had confirmed his decision. Mac was asked to design the high-profile event's lighting by Creative Director Beatrice Chia, with whom he has worked on previous large scale events including Singapore's National Day Parade. Mac also lit the Opening Ceremony of the 1998 Commonwealth Games in Kuala Lumpur and has been involved in a plethora of innovative theatre work.

The 2015 SEA Games Opening Ceremony was also Mac's first gig using a substantial amount of Robe products! He chose the BMFLs after careful consideration, and primarily because of their incredible output! With trim heights of between 37 and 39 metres to the overhead trusses in the new National Stadium at the heart of the Singapore Sports Hub, he needed lights with some serious attitude and intensity. Robe's super-bright feature-packed BMFLs met all the requirements!

Photo © Louise Stickland

Photo © Louise Stickland

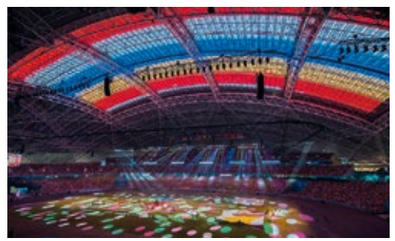
Photo © Louise Stickland

Three hundred and sixty BMFL Blades – the newest in the BMFL range - were rigged on eight trusses - 20 fixtures per truss - running along both sides of the pitch. The 100 x BMFL Spots were located on four trusses, two at each end of the stadium roof. The total field-of-play size for the OC was 160 metres long by 95 metres wide, and Mac used the BMFL Blades as his key lighting for the whole floor area, and also for illuminating the hugely excited capacity audience who are seeing their country host the biennial event for the first time since 1993. Mac specifically needed the BMFL Blades with their framing shutters for this task. This functionality allowed him to divide the pitch area up into precise slices of light, effectively creating a matrix of lighting 'areas' which could then be blended together or run as separate patches of intense colour and texturing. This produced some very funky and fabulous looking effects, especially for the overhead camera shots. Designating a specific area for each BMFL blade to cover in its 'home' position gave the option of adding either very subtle or completely full-on lighting to suit the eye-catching projections. "To have this flexibility and adaptability with the fixtures was incredible," he commented, adding that complimenting the field-of-play 'pictures' – a major visual focus throughout the 2 hour show which included the Athlete's Parade – with lighting was an intricate task for him and his programming team working in close collaboration with Singapore based projection specialists, Hexogon.

The show narrative was developed from the theme of DNA, a common element shared by all, which is also the source of individuality and something that can make people 'extraordinary'. DNA helps drive people to achieve, inspire and dream, all goals, aspirations and core character traits associated with the spirit of sport, and being a small and considerate empathetic cog in the giant wheel of humanity. The idea of a DNA 'structure' was also the origin of Mac's grid of BMFL Blades. And these formed the fundamental building blocks enabling him to creatively light the show.
The 100 x BMFL Spots on the four end-trusses were primarily used to illuminate the multi-layered stage in the middle of the field-of-play, which featured much of the acting, story-telling and ceremonial action played out by a cast of several thousand. Throughout the show, the rich colours and high quality of the BMFLs accentuated the intimacy of a theatrical masterpiece brought alive on an epic scale.

The show contained many emotional touches that communicated to the audience on a personal level – both live and on TV – all combining into a beautiful, very elegant and highly memorable Opening Ceremony. Mac worked alongside a highly talented FOH team comprising assistant LD Marc Brandon Hor, lead programmer and show operator Michael Chan, programmer Muen Huang. Showtec crew chief William Lee co-ordinated a crew of up to 50 Showtec lighting technicians at the peak times during the OC cycle, and they were on site for the best part of two months in the run up. The show's Technical Director was Kenny Wong.
A grandMA2 system was used to control all the lighting which also included some other moving lights and LED pixels embedded in the stage. Separate lighting systems – also supplied by Showtec – were installed outside the stadium to light the final stages of the torch relay and the cauldron.
The Opening Ceremony was the first job for most of Showtec's new BMFL fixtures. The newly launched BMFL Blades were delivered from Robe in the Czech Republic in time to be loaded straight into the stadium during April.

Robe's Josef Valchar attended the OC and commented, "The show looked incredible! I was extremely proud to see so many fixtures on one show and that Mac trusted a brand new light on such an important and grand scale event. It was also a great endorsement of the Robe brand for Showtec to make such a major investment in our products".



Christie Projectors Used to Set New Guinness World Records Title for the Greatest Light Output in a Projected Image

A total of 160 Christie Roadster J Series projectors used by Hexogon Solution Pte Ltd for an event smashed previous record with three times the brightness. The total brightness of the projected image by 160 Christie Roadster Series projectors exceeded 3,200,000 lumens, creating a new world record. Hang-mounted on specially-built towers above the highest seating area in the stadium, the entire fleet of projectors was carefully set up by the experienced team of engineers and technicians from Hexogon Solution. They spent long hours blending and calibrating the projected images that displayed in stunning 4K resolution. Two dedicated control rooms were set up above the seating area – one on each side of the stadium – to house the Pandoras Box Media Servers and other equipment that supplied the contents to all projectors.
The stunning and highly detailed 4K content was concentrated right in the centre of the field of play, and much of the time bordered by a dynamic and animated ring of light from the BMFL Blades buffering between the end of the projections and the edge of the pitch.

Photo © Louise Stickland

Bright Shine for the SEA Games Closing Event

The Closing event's lighting required a completely different approach to the flamboyance of the opening, as it was more ceremonial in nature with closing speeches and presentations which focused on the athletes and the achievements of 10 days' sporting competitions. The athletes and volunteers parade was followed by the handover ceremony to the 2017 host, Malaysia, accompanied by their "Diversity in Motion" cultural performance, a dance and movement orientated piece that played on light, dark and shadows. This was followed by a parade of floats featuring stamps depicting 22 landmark moments in Singapore's history.

Then... the whole National Stadium erupted into an immense dance party and rave as Dutch EDM guru Ferry Corsten took to the stage providing a thumping outro to one of the most successful SEA Games events ever. Mac really enjoyed lighting all elements of the two events, and this one especially. The BMFLs had to work even harder for the Closing as, due to the lack of time between the show starting and the last track-and-field events finishing, there was no time to rig any lights around the FOP, so everything was relying on the top rig ... and the BMFLs!
Despite the tight timeframe and all the pressure on producing a great show, Mac's imagination and experience shone through just as the mega-bright BMFLs cut through the fog, haze and humidity to illuminate the vast performance space so effectively. Once again Mac worked closely with a fabulous FOH / control team of assistant LD Marc Brandon Hor and programmer / show operators Michael Chan and Muen Huang. The Showtec crew chief was William Lee. "It was GREAT to work on such an exciting event with many lovely people and such exciting new lighting hardware ... I thoroughly enjoyed the entire process of creating these shows and I am very proud to have been involved," concluded Mac.

A Marker is Set for Future Sports Events in the Region

For the Opening and Closing Ceremonies and all the sporting events in between the International Broadcast Centre (IBC) provided working space for ten Rights Holding Broadcasters (RHBs) – with the largest premises measuring 120 m2. MediaCorp – Host Broadcaster and RHB – reported high ratings from their role as domestic broadcaster. "We have had unbelievable ratings in terms of the number of Singaporeans watching the Games. While, in part, that was because we won a lot of medals, it was also because the coverage was excellent. It was an enjoyable experience to watch the Games, that is what we wanted and the audiences justified our decision to aim for higher production standards," Remesh Kumar, Senior Vice President – English Entertainment Productions, confirmed.

HBS believes its best-ever coverage goal will lay down a marker for what is expected of a major sports event broadcast in the region, along with setting a big challenge for future events such as the 2017 SEA Games in Malaysia and the 2018 Asian Games in Indonesia. Legacy is a key factor of HBS's involvement in the 28th SEA Games, and not just for local stakeholders. "Our message to future Games hosts is don't underestimate the difficulties, they are real, but don't worry as we can help and train you," Wlochovski added. "Then maybe once we have done it together, the following time you can do it on your own. That's the legacy."

Left to right : Marc Brandon Hor (Assistant LD), William Lee (Showtec Crew Chief), Mac Chan (Lighting Designer), Michael Chan (Show Lighting Operator) and Muen Huang (Programmer)

江苏电视台

JSBC JIANGSU BROADCASTING CORPORATION

LIVE PORTRAIT

OB Vans

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As one of the most influential media operators in Jiangsu and in China, JSBC is striving to become a highly acclaimed mainstream media operator as well as an internationally well-known media outlet incorporating comprehensive media services, such as television channels, radio frequencies, newspapers, magazines and Internet products. Moreover, JSBC is turning herself into a leading provider of news, culture and entertainment content as well as a top provincial-level broadcasting network in China. Established in June 2001 out of merger and acquisition, the 3,400-employee Jiangsu Broadcasting Corporation (Group) or JSBC, adopts matrix management supervising eight administration departments, eight business sectors and five subordinate units.

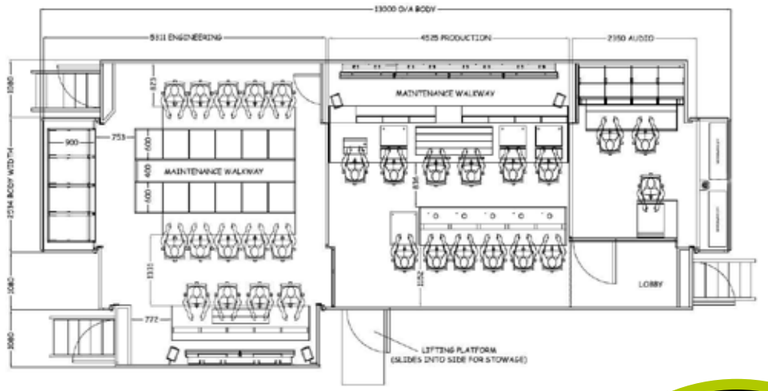
JSBC incorporates 14 television channels, including 2 satellite television channels (Jiangsu Satellite Channel and International Channel), 7 terrestrial television channels (City Channel, Variety Show Channel, Film and TV Channel, Public Channel, Channel Win, Children's Channel and Business Channel), 4 digital pay TV channels (Fashion Channel, Kid's Education Channel, English Education Channel and Fortune Channel) as well as a mobile TV channel (Jiangsu Mobile TV). In the meantime, JSBC operates 11 radio frequencies, i.e. the General News Radio, the News Radio, the Voice of Jinling, the Jiangsu Communication Broadcasting Network, the City FM, the Classical Music Radio, the Art Radio, the Story Radio, the Healthy Life Radio and the Economy Radio. In addition, JSBC also runs film studio, cinemas, audiovisual press, aside from newspapers, magazines, websites and affiliating school, widely covering the different sectors of the mass media industry. In this sense, JSBC has acquired advantageous resources to facilitate multimedia operation and multi-channel broadcasting in the domestic and the international markets.

From 2004 to 2008, JSBC is listed among China's 500 Most Valuable Brands. According to the 2008 release, the brand value of JSBC amounts to 5.631 billion RMB, ranking 4th among all media brands in the list.

VSM from L-S-B

Sound Area

SloMo Area



Vision Control

Production Area

Patchpanel

TECHNICAL SYNOPSIS

JSBC 4K

OB Van

Video

- 16x Sony HDC-2580 cameras with HDCU-2080
- 04x Sony PVW-F55 cameras with CA-4000
- 04x Vislink Wireless Camera Adaptors
- Lenses from Fujinon
- Tripods from Sachtler
- Production A HD
- Vision Mixer Sony MVS-7000X 3ME
- Monitor Wall 8 X SONY LMD 42”
- Production B 4K
- Vision Mixer Sony MVS-7000X 4ME
- Monitor Wall 2 x SONY PVM-X300 4K mon, 6 x SONY PVM-A250
- Evertz Multiviewer VIPX and VIPA
- 2x EVS XT3 6ch
- Digital Glue: Evertz
- System Controller: 2x L-S-B VSM Studio Server
- Video Matrix: Evertz XE 128 x 128
- Sync and Measurement: Tektronix SPG-8000 and WFM-5250

Audio

- Audio Mixer: Lawo mc²66 MKII
- Backup Mixer: Yamaha DM1000
- Audio Matrix: Lawo Core with Dallis Frames
- Monitoring: Genelec 5.1
- Measurement: RTW TM-7

Intercom

- Matrix: Riedel Artist 64 x 64
- Wireless Talk-Back: Motorola with RiFace

Coach Built

- Length: 13,6m
- Height: 4,0m
- Width (stowed): 2,5m
- Width (expanded): 5,7m
- Coach Builder: ASGB
- System Integrator: Sony China Professional Systems Group, NDT Group

NDT group is a renowned distributor and system solution provider in the broadcast, telecommunication and other professional industries in China. Our area of services ranging from design, system integration, product distribution and consultant works. Major customers in China are TV stations, network companies and etc.The history can be traced back to 80s of the last century when our senior staff joined our company and provided services in this TV broadcasting industry. In year 2000, the company went through a strategic re-organization to form the NDT group with headquarter in Hong Kong. The operation centre is located in Beijing to strengthen the support and services in the China market. There is around 200 staffs with offices and subsidiaries in many cities in China.

Professional Audio, Video and Broadcasting System

With versatile experiences and market proven track-record, NDT is recognized by most of the customers in the broadcasting and telecommunication market as one of the best suppliers and system integrators providing most flexible and comprehensive system solutions. NDT provides a wide range of products/solutions covering ENG/EFP, Studo Production, Post-Production, Audio Production/Post-Production, Master Control System, Playout/Presentation and OB vans.

Digital TV Headends, Contribution, Distribution and Transmission system

With expert team and board experience in related fields, NDT offers end-to-end digital TV Headend, Contribution, Distribution and Transmission solutions. Product ranges including digital compression equipment, fiber-optical system, CATV headends, Network Management to CA systems. As new media business starts to bloom, NDT also heavily involves Mobile-phone TV, Internet TV, IPTV and many other new media services. Our strength in R&D providing various application software and customized solution plays a very important role in positioning ourselves as a Solution Provider.

Wireless Transmission and Satellite Communication System

NDT has achieved great success in the wireless and Satcom business. We've integrated and supplied more than 50 DSNG vans and Flyaway systems. CCTV, China Telecom, China Unicom and many other renowned Broadcasters are among the list of our key customers. Digital microwave systems and Wireless Cameras are other key areas of services. Other special projects including fiber-optic van, 3G (Bandwidth) SNG truck ready for 1080P or 3D telecast services. During the Beijing Olympics, NDT services as a base for technical support on various microwave systems during the torch relay and the actual games. This shows our continuous effort providing best services for our customers.

Application Software and Customized System

Equipment Supply, System Integration and Application Software form the golden- for NDT's Total Solution Approach. Our R&D team is equipped to provide Application Software addressing the market demand solving customer's problem. With strong partnership and alliances with technology leaders from all over the World, NDT is in a good position to understand the problems that many other users in the World is facing the different approach providing solutions in the market. Currently, we provide the following solutions as the following: "AIR" Automation system, "Asteria" Smart Monitoring system for device configuration, various levels of control, signal monitoring and alarm system for broadcast network, "UMD" source name tracking under-monitor-display system and "Polynices" server-based online editing software system for studio production use.

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Riedel media network solutions for signal distribution

The 2015 Giro d'Italia cycling race began on Saturday, May 9, with a 17.6-kilometer team time trial along a magnificent coastal bike route on the Italian Riviera that stretched from San Lorenzo al Mare to San Remo. Following 21 stages that included 12 mountain stages, seven flat stages, and two time trials, the tour concluded on Sunday, May 31, with a 185-kilometer road stage from Turin to Milan, where riders then completed seven laps of a city center circuit.

Riders covered 3501 kilometers over the course of this three-week Grand Tour, the year's first in a trio also including the Tour de France and Vuelta a España. As the Giro d'Italia broadcast rights holder and long-time host broadcaster, Rai dedicated extensive airtime to coverage and streamed each stage live via the Internet at *www.rai.tv*. As it had in 2014 for the 97th version of this renowned race, the broadcaster again relied on Riedel Communications' real-time media network solutions to provide the flexibility and reliability essential to high-quality signal distribution, even in the face of significant environmental and logistical challenges.

22 MEDIORNET FRAMES FOR THE GIRO D'ITALIA 2015

Riedel products are engineered to provide the reliability, quality, and flexibility essential to communications and signal transport in demanding live production and broadcast environments, including a world-class pro cycling tour. Rai worked so successfully with our MediorNet and RockNet systems for the 2014 Giro d'Italia that the company again worked with our gear, as well as our local partner, Broadcast Solutions SRL. Together, the companies configured 22 MediorNet frames in a real-time network that would facilitate thorough coverage of the Giro d'Italia. Rai also used this communications and signal transport infrastructure to provide the feeds that ultimately enabled coverage in numerous countries and territories across the world, as well as on aircraft and cruise ships.

Every day on the tour required a different setup in a different location, making for an especially complex OB event, particularly in terms of communications and signal transport. As the 98th Giro d'Italia wound its way from the Italian Riviera to Milan, Rai moved a convoy of as many as 28 vehicles as many as 300 km each night. Trucks included uplinks, a generator for power, multiple OB vans for host and other broadcasters, as well as support vehicles carrying additional cable and gear. Each morning, the broadcaster positioned an OB compound as close as possible to the day's finish line. Within many of these mobile units, Riedel equipment contributed to a flexible decentralized fiber-based network supporting real-time distribution of audio, video, and communications signals. The network engineered for this year's race comprised four fiber rings, which together included 102 fiber links with 712 audio, video, and data connections.

Rai deployed Riedel MediorNet Compact Pro and RockNet systems to link key connection points including the international OB van and a second OB truck with replay; the commentator van, a graphics van, a radio van, and another van providing links to helicopter and motorcycle signals; the Italian national feed; an edit truck; and the "mule," a compact mobile unit ideal for tight mountainside locations.

Each of the four rings was assigned a color to help the Rai team quickly identify the signals being carried on any given fiber cable. For example, the most important connections were marked in yellow, which represented helicopter and motorcycle feeds, as well as both the Italian and international broadcast feeds, in a redundant configuration. The green ring was more generic, responsible for camera feeds and back-up signals. Both the red and blue rings were dedicated to servicing I/O between the international OB van, replay, and the mule unit located near the finish line and commentary position. In all, the four rings provided connections for ten trucks, each of which was uniquely configured with MediorNet systems according to its requirements, with a Rocknet audio network also installed in the radio van.

During the 21-stage race, Rai used the mule unit and its Riedel gear to complete connections of up to 2 kilometers from the main production area. Positioned near the finish, this small truck supplied the camera base stations and gear for a commentary position and connection point at the finish line, where all baseband signals originated. These signals included various HD sends and returns, two super slo-mo cameras, data, Ethernet, IFB, and comms, plus the commentary microphones

Combined with our network management software, the modular design of our MediorNet real-time media network and RockNet audio network allowed Rai to configure and reconfigure frames quickly according to the demands of each day. Supporting both routing and transport, the Riedel systems enabled engineers to make every signal available at every node as needed. Able to supply signals from various remote points without signal degradation or loss, Rai was able to provide exceptional footage facilitating worldwide coverage of the race.

Riedel Fiber Topology for the Giro d'Italia

The overall fiber network served as a flexible and space-, weight-, and time-saving solution for establishing quality connections across an extremely challenging landscape. These benefits are particularly compelling when Rai's Giro d'Italia coverage demands hauling all it over hundreds of kilometers and through mountainous terrain. The speed with which the team on the ground was able to build and tear down the fiber networks also was significant. Taking advantage of straightforward configuration and routing capabilities, Rai engineers were able to build out the fiber network in about three hours each morning and then spend another two hours in the evening to tear it down again. Had the broadcaster attempted this in a conventional manner, using copper cabling, the time and cost of transport and labor would have made it difficult, or even impossible, to provide extensive race coverage.

On nearly every day, broadcast coverage on Rai channels began with a 90-minute live morning show with a feature on the town or village in which the stage would begin, along with various notable sites along the way, and then actual stage start. For each stage, broadcast channels provided an additional three hours of live programming including a preview, a look at live action, and the final hour of racing, as well as post-stage commentary and analysis. RaiSport Uno concluded each day with two further programs dedicated to the race. A 90-minute package of edited highlights from each stage was aired once each evening after the day's stage, and twice the next morning across the Rai channels RaiSport Uno and RaiSport Due.

The Giro d'Italia is a hugely popular sports event in Italy and beyond, and this year it was televised around the world in 171 countries. With Riedel MediorNet and RockNet systems, Rai was able to offer extensive live and pre-produced content each day of the race while also providing, as host broadcaster, the reliable feeds critical to global coverage of the event. In the end, Rai was successful in delivering compelling coverage that proved enormously popular with viewers worldwide. In the exciting final hour of the 20th stage, which finished with the difficult Colle delle Finestre climb and effectively confirmed Tinkoff-Saxo team leader Alberto Contador as the overall race victor, an average 3,500,000 viewers watched Rai coverage of the race.

Maribel Roman,
South Europe International Sales Manager at Riedel Communications

TOPVISION

LIVE PORTRAIT

OB Van

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UEFA CHAMPIONS LEAGUE FINAL CAPTURED LIVE IN 4K USING SONY HDC-4300

Another new milestone for TopVision & Sony Partnership

TopVision achieved a new highlight in its collaboration with Sony this year with the 4K live broadcast of the 2015 UEFA Champions League Final in Berlin.

80,000 spectators followed the action at the UEFA Champions League Final between FC Barcelona and Juventus Turin at the Olympic Stadium in Berlin, with a further 380 million people watching the match on TV in over 200 countries around the world. Some supporters were even able to enjoy all of the action live in mesmerising 4K quality. Private technology service provider TopVision Telekommunikation GmbH & Co. KG, relied on the new HDC-4300 4K/HD Live System Camera and the full 4K workflow from Sony for the broadcast. Following the great success of the 2015 German Cup Final, the 2015 UEFA Champions League Final in Berlin was the broadcaster's second opportunity in quick succession to produce a critical match in 4K resolution.

SONY

Football fans did not have to wait long for another chance to enjoy the 4K experience live thanks to the broadcast from the Olympic Stadium in Berlin. Several national and international broadcasters picked up the signal live via the 4K distribution network operated by the European Broadcasting Union. Certain locations in Germany even showed the match in Ultra-High definition. The broadcasts from the German capital city represent a new highlight in the long-standing and successful collaboration between TopVision and Sony.

TopVision and Sony Professional — a success story that has covered many milestones

Alessandro Reitano, Director Sports Production Sky Germany

Linkin Park Live Recording and Transmission in 4K

For more than 20 years, the Berlin-based private technology service provider has been in a league of its own when it comes to the live production of sports events and live shows. The service provider was already playing a pioneering role when HD and stereo 3D were first introduced, and it is the TopVision OB trucks that provide the images for the German Bundesliga, the Champions League and various other international football matches.

In April 2014, on behalf of pay TV broadcaster Sky Deutschland, TopVision successfully delivered the world's first UHD live transmission of an entire football match (FC Bayern vs. SV Werder Bremen). In recognition of this achievement, the technology producer and Sky won the award in the "Best Ultra HD TV Technology or Project" category at the 2014 CSI Awards held in Amsterdam. A total of six Sony 4K cameras were combined with another six HD signals that were converted to 4K in the new trucks primarily for slow-motion shots. The Sony 4K cameras captured the thrilling match that culminated in a 5:2 victory for the team from Munich, with every bit of the action available at a resolution of 2160p50 on multiple ultra HD televisions in the Sky headquarters in Munich-Unterföhring.

The long list of other important sports projects successfully completed by TopVision using Sony 4K technology was the broadcast of the 2014 DFB Cup Final (Bayern Munich – Borussia Dortmund) on 17 May in Berlin and the UEFA Champions League match on 4 November 2014 (Borussia Dortmund – Galatasaray Istanbul), Also these productions were supported by Sky Germany. Alessandro Reitano, Director Sports Production Sky Germany, explaines:" We continuously test the technology, the story telling, the distribution channels and much more until we eventually switch Ultra-HD-Production. That still will take some time, however we already have made significant progress." On 30 May this year, TopVision once again broadcast the DFB Cup Final live in 4K. This signal was transmitted exclusively to 13 sports bars in Germany through the technical equipment provided by Sky. The real "stress test" ultimately came on the 6 June when the UEFA Champions League Final was broadcast from the Olympic Stadium in Berlin.

In addition to these major sports events, TopVision is also setting a high benchmark for the production of music events in 4K resolution. The company's achievements also include the world's first live transmission of a concert in 4K: In collaboration with Music-Delight Productions GmbH, TopVision broadcast the Linkin Park concert live to people's homes via satellite link on 19th November 2014. A total of eleven Sony PMW-F55 live camera chains were used for the major production in the capital, and a PXW-FS7 captured the images for the associated documentary. At some locations, Linkin Park requested special equipment for modifying the 4K lens, as well as shaker technology as a stylistic device. After extensive tests, and due to the production's high quality requirements, the service provider had also previously been the first European production company to invest in the new PWS-4400 server technology from Sony.

sky SPORT

Total View HD Ü2

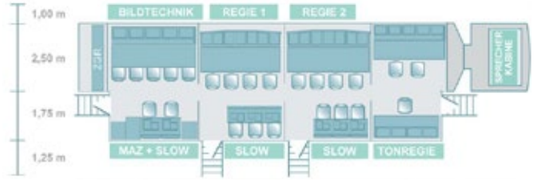
Audio Area

Inside View

Camera Shading Area

Production Area

SloMo Area



Video

- 04x Sony Camera HDC-1000
- 08x Sony Camera HDC-1500
- 08x Sony Camera HDC-2500
- 02x Sony Camera HDC-3300
- 03x Sony Camera HDC-4300
- 06x Sony Camera PVW-F55
- Connectors on Cameras, CCUs and Cables: Lemo Fiber,
- Lenses from Canon, all Focal Lengths available
- Tripods from Sachtler and Vinten
- Vision Mixer: 2x Sony MVS-7000X
- Digital Video Effects: 2x Sony MVE-9000
- Character Generator: VizRT Trio
- Monitors Production Area 1+2: 8x Sony BVM F250 and 130x Marshall 10”
- BVM-X300 30” OLED 4K
- Monitors Camera Shading Area: 6x Sony 20” LMD, 5x Sony BVM F250 and 30x Marshall 10”
- Multiviewers: Miranda Kaleido X
- Sony VTRs: 2x SRW-5000, 4x HDW-M2000, 4x PDW-F1600
- 4x Sony PVW-4400
- 8x EVS XT3 8ch
- Digital Glue from Lynx
- Video Controller: BFE KSC
- Video Matrix: Grass Valley Trinix 576 x 1152
- Video Measurement: Tektronix WFM + WVR

Monitor Wall Layout

TECHNICAL SYNOPSIS

HD Ü2

OB Van

Audio

- Audio Mixer: Stagetec Aurus
- Audio Router: Stagetec Nexus Star
- Audio Monitoring: Adam 5.1
- Audio Multi-Track Recording: Steinberg Nuendo
- Microphones from Sennheiser, Schoeps, DPA, Neumann

Intercom

- Matrix: Riedel Artist 256 x 256
- Wireless Talk-Back: Motorola with RiFace
- ISDN Codec: Riedel Connect Duo

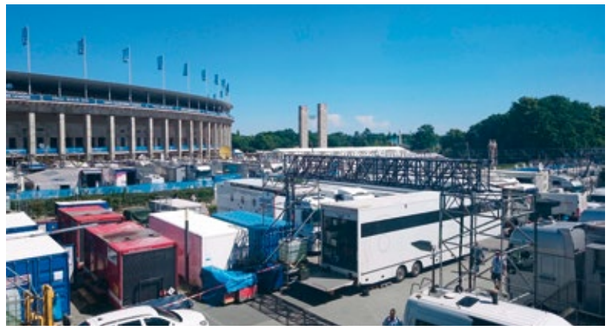
Coach Build

- Length: 16,5m
- Height: 4,0m
- Width (stowed): 2,5m
- Width (expanded): 4,25m
- Weight: 40t
- System Integrator: BFE
- Coach Builder: Bischoff + Scheck

The HDC-4300 from Sony: the centrepiece of a modern 4K live production

For the match between FC Barcelona and Juventus Turin, TopVision used the new Sony HDC-4300 4K Live System Camera launched for the first time in April this year, as well as Sony's tried-and-tested PMW-F55 camera to capture crystal clear, electrifying images for viewer's at home. The entire production project required 12 cameras, including five slow motion workstations and a highlights editing suite. "We were very satisfied with the way in which we were able to deliver the complex network of individual resources and feeds, including graphics etc.", explains Kerstin Fluhrer, Head of Production at TopVision.

The cameras were instantly distributed to meet the requirements for the camera positions and to create the required image. TopVision relied on the HDC-4300 in Berlin primarily for long focus shotswhile the production team went for products like the Sony PMW-F55 as a hand-held camera. UEFA' s end-to-end live production workflow also included Sony's PWS-4400 4K server and the MVS-X series multi-format switchers. For live monitoring in the OB trucks, UEFA used the Sony BVM-X300 30" OLED 4K monitor. The Sony FWD-85X9600P professional 85" BRAVIA-4K LED display was also part of the on-site setup for the 4K live showcase. Developed especially for sport and studio productions, the HDC-4300 offers extreme flexibility for live productions in HD, 4K and up to 8x super slow motion in HD. The world's first native 2/3" 4K image sensor—fresh from the 2015 NAB show in Las Vegas—builds on the success of the HDC cameras launched by Sony to date. Supporting the standard industry B4 lens mount, the camera is fully compatible with all HDC accessories, allowing it to easily slot into existing live production systems.



"This camera offers 4K capabilities and a workflow that content producers are instantly familiar and comfortable with", says Norbert Paquet, Strategic Marketing Manager at Sony Europe. "We developed the HDC Series as a flexible platform that allows our customers to maximise their ROI with multiple applications. Thanks to its full 4K-RGB resolution, the HDC-4300 supports several formats for daily HD applications and for sport broadcasts requiring an image frequency of up to 400 frames per second."

TopVision firmly believes that Sony has the greatest potential when it comes to opportunities and the range of UHD-capable broadcasting equipment. This applies both to the variety of camera types and to recording facilities. "In our view, the HDC-4300 is the most flexible camera system available because it has a B4 lens mount and as such resolves the "bottleneck" in optical technology. With its 35-mm chip, the PMW-F55 creates a fantastic film look", explains Fluhrer. "The support we received from Sony during all of our events was without doubt excellent. Without the manufacturer's support, we certainly would not have been able to complete our productions in this format at such a high technical level."

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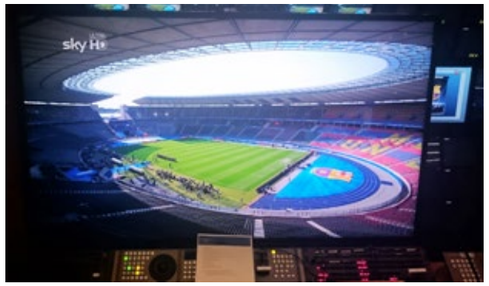
TopVision is happy to report that it has handled all of its productions to date to the complete satisfaction of its customers. The company sees the main potential for future optimisation in the form of additional signal processing in the OB trucks and with recording devices with the lowest possible degree of data compression. "The 4K technology gives the viewer an unbelievably intense and enthralling experience. The images have an almost three-dimensional nature with absolute depth of field. 4K provides a new visual experience, watching images from live events in a quality you've not seen before", says Fluhrer.



Innovating with 4K

TopVision's latest project was the recording of a concert by German rock group "Böhsen Onkelz" at the Hockenheim Ring using 21 UHD cameras on 19 and 20 June this year. All of the cameras were set up for UHD as well as recording in HD before playing onto hard disk drives. The broadcaster recorded all of the UHD signals onto the Sony PWS-4400 server.

"We see our company as an innovation leader in Germany and we are of course keen to play our part in driving the development of UHD technology. As 4K is not yet widely available to television viewers, we see further opportunities in the production of 4K material for Blu-ray distribution and hope that more and more customers will recognise the added value of UHD productions", concludes Fluhrer.

"No other technical service provider in Europe can draw on the same length and depth of experience using Sony technology as TopVision. We are very pleased that they have sent a strong signal to the industry by making a continuing investment in 4K. TopVision continues to work hard with us to offer sports and music fans a unique, brilliant viewing experience in 4K ", says Ralf Zuleger, Key Account Manager at Sony Professional, who advised TopVision when it came to selecting and adapting the equipment. Find out more at ***www.topvision.tv*** & ***www.pro.sony.eu/beautifullyefficient***

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LIVE
PORTRAIT

Gearhouse Broadcast

About Gearhouse Broadcast

Gearhouse Broadcast is a market leader in the field of broadcast services and specialises in broadcast equipment rental, equipment sales, outside broadcast, project solutions and systems integration. Operating globally from its offices in the UK, Australia, US, Qatar and France, the company offers huge experience and a proven track record in delivering major world sporting and entertainment events.

Clients turn to Gearhouse for the most complex, mission-critical broadcast requirements locally and on location anywhere in the world. Renowned for supplying high quality broadcast equipment, production facilities and project management support, Gearhouse has a reputation for expertise, reliability and advanced technology. Bespoke production solutions from Gearhouse have earned it an enviable track record as a provider of cost-effective, modular equipment and solutions for all types of broadcast needs.

Gearhouse OB trucks at Australian HQ

Find out more at ***www.gearhousebroadcast.com*** and follow on Twitter ***@GearhouseB***

HD5 and HD6 at Australian HQ

Australian Open at Melbourne Park

Gearhouse Broadcast Australia

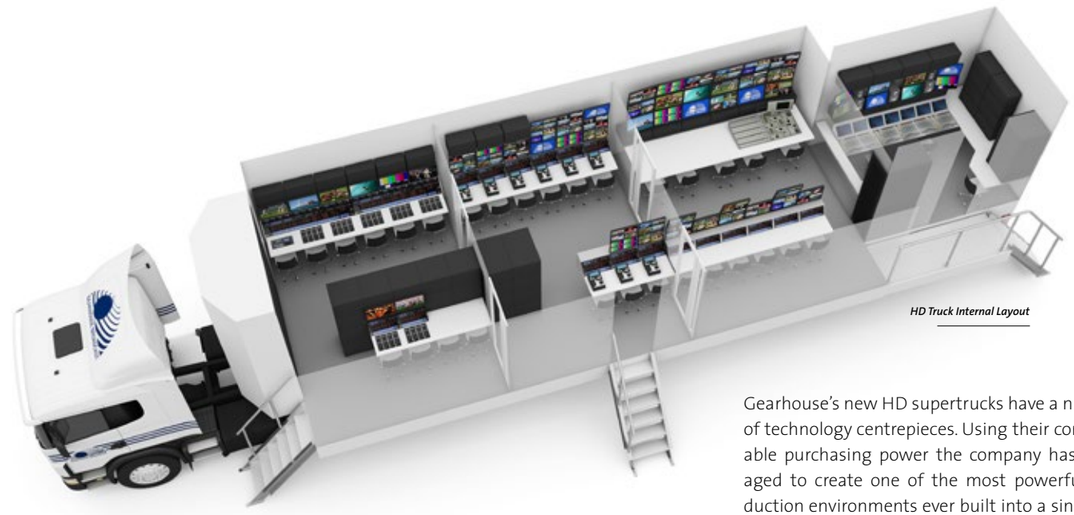
Gearhouse Broadcast Australia is located in Sydney and Melbourne. It provides broadcast services around Australia specialising in outside broadcast, project solutions and dry hire equipment rental. Gearhouse Broadcast Australia is a leader in HD outside broadcast technology. Its ever-growing fleet currently consists of seven HD supertrucks, two mid-size HD units and one SD unit. The outside broadcast business covers a wide range of sporting and entertainment events, most notably the AFC Asian Cup, V8 Supercars, Australian Rules Football (AFL) for Network 7, Super 15s Rugby, the NBL and A-League Football for Fox Sports and the ANZ Netball Championships. Project Solutions delivers broadcast solutions for major televised sporting events and reality television. Gearhouse has lead projects such as Australian Open Tennis (HB Technical Facilities provider), I'm a Celebrity... Get Me Out of Here! for Granada Australia, X-Factor, My Kitchen Rules, House Rules and Spelling Bee amongst many others.

Gearhouse's dry hire business stocks a full range of the latest broadcast facilities. Gearhouse prides itself on working closely with clients and manufacturers to invest in the latest equipment and technologies to meet market needs. Gearhouse offers one of Australia's largest inventories of high definition broadcast equipment, including the latest 4K, HD and SD broadcast camera systems, lenses, VTRs, EVS workflow solutions, graphics tools, radio cameras, audio, monitors and peripherals.

Gearhouse Broadcast's continuous expansion and investment has placed it as one of the leading OB facilitators in Australia. It fulfils many of the demands for most of Australia's key producers and television networks. Gearhouse's clients are some of the largest most respected broadcasters and programme makers in the region including:

- ***Fox Sports – Australia***
- ***V8 Supercars – Australia***
- ***Foxtel – Australia***
- ***Network 10 – Australia***
- ***Seven Network – Australia***
- ***Granada – Australia***
- ***Fremantle Media – Australia***
- ***Shine Australia – Australia***
- ***AFL Media – Australia***
- ***ESPN – USA***

Camera Shading Area



HD Truck Internal Layout

Gearhouse Broadcast Australia OB Supertrucks

State of the art production vehicles

As part of its ongoing commitment to the Australian market Gearhouse Broadcast has commissioned and launched four new state of the art 30-camera HD OB supertrucks HD5, HD6, HD7 and HD8 and one hybrid supertruck HD9 in Australia within the last 36 months. These new trucks complement Gearhouse's existing HD1 and HD10 HD supertrucks, HD3 and HD4 mid-size HD trucks and their SD truck and represent a multi-million dollar investment by the company which has taken the market lead in the provision of high quality outside broadcast services.

The new trucks are very much in keeping with Gearhouse's global philosophy where quality and presentation are paramount. Five new trucks is a big investment by any company's standards in today's challenging marketplace but Gearhouse has experienced significant year on year growth which in turn was the driving force behind their commissioning. The new trucks demonstrate the demand in the Australian market for this level of OB supertruck. The fact that HD8 is a native 4K truck and HD9 is a hybrid truck also show the extended depth and breadth of Gearhouse's offering.

Not only do the trucks meet the market demand and add significant capacity to Gearhouse's ever-growing fleet, but they have been designed specifically with the latest broadcasting requirements and workflows in mind. The trucks also set the standard for efficient layouts providing a larger production space and more processing power than any other single truck in the market, with one of the new supertrucks now capable of doing the work that would previously have taken two standard OB trucks.

Each of the new supertrucks had its chassis built by the world-renowned coachbuilders A. Smith of Great Bentley in the UK, a process taking six months per chassis before it is shipped for integration in Australia. The trucks also feature the latest in lighting, expanding sides, physical auto levelling and 90KW of water-cooled air conditioning as standard.

Gearhouse's new HD supertrucks have a number of technology centrepieces. Using their considerable purchasing power the company has managed to create one of the most powerful production environments ever built into a single OB vehicle. Based around the NVISION NV8576 hybrid main vision router that embeds and de-embeds internally, the true hybrid router offers extensive functionality to a high number of operators and significantly simplifies even the most complex production setup. In keeping with their best of breed approach the trucks are particularly well equipped and finished to the highest levels. Standalone areas include an audio mixing and control room, replay area, production gallery, CCU and vision control and engineering space providing Gearhouse's clients with everything they need from signal acquisition to finished programme transmission.

Some of the supertrucks' main product highlights include the fact that they are all wired for 24 CCU and 6 POV cameras and seven 8-channel EVS XT3s, they all feature an 80 input, 36 output Sony MVS-7400 mixer, have four VTRs, five replay transition devices, a 64 fader mc²56 Lawo audio desk and Riedel Artist 192-port talkback system.

HD5 Camera Shading Area

Production Area

Audio Area

CAT Patching

The term "4K ready" can be very misleading, especially when it comes to the world of OB super trucks. Hence the fact that one of Gearhouse's newest trucks, HD8 is simply referred to as a "native" 4K OB supertruck. In order to be a native 4K truck you have to be able to handle everything from acquisition to production in real 4K and that's exactly what the HD8 supertruck does. Part of the raison d'être for HD8 comes from Gearhouse's close association with Hitachi and the launch of the company's award-winning new broadcast 4K ultra-HDTV camera the SK-UHD4000.

In the past you could only use 4K cameras with prime lenses and not zoom lenses. The new Hitachi SK-UHD4000 ultra-HDTV camera changes all that and enables the use of existing zoom lenses. Gearhouse purchased the first fifty SK-UHD4000s available, twenty of which went to Australia and twelve of which are used in the HD8 4K supertruck. In addition to the new Hitachi SK-UHD4000 ultra-HDTV cameras the HD8 4K super truck also boasts a Sony MVS-7000X 4K vision mixer, Sony 4K monitoring and a 4K EVS replay system.

EVS Area

Main EVS area

HD8 is even more than that as in addition to being Australia's first native 4K truck HD8 is also capable of 2K, HD 1080i, HD 1080p and SD. For 4K HD8 is 12 camera capable. For HD it follows along the same specs as the HD5, HD6 and HD7 super trucks at 30 camera (24 CCU and 6 POV) capable. There's more continuity too as HD8 carries the same 64 fader mc²56 Lawo 5.1 capable audio desk, Riedel Artist 192-port talkback system and NVISION NV8576 hybrid main vision router as the existing trucks so all Gearhouse clients can be comfortable with the systems they've used so many times before.

Standalone areas in HD8 include an audio mixing and control room, replay area, production gallery, CCU and vision control and engineering space providing Gearhouse's clients with everything they need from signal acquisition to finished programme transmission.

Gearhouse Broadcast Australia's newest supertruck HD9 is truly Australia's first full, multi-purpose, hybrid OB facility offering a bespoke range of broadcast and production facilities to clients, customers and users. As well as having the very latest in RF, graphics and EVS capabilities HD9 has also been configured so it can offer the facilities provided by small and mid-size trucks but with the advantage of a far larger production area.

Audio Area

Production Area

Main RTR, Glue & Power

HD9 was built primarily to provide a suitable facility that could house a number of unique aspects of the V8 Supercars TV production requirements that were either previously being out-boarded into site sheds or in the case of the new Fox Sports unilateral production, had not previously existed on site and required a dedicated bespoke facility. With HD9 Gearhouse also saw a gap in the market for a new mobile facility that would be more suitable for larger add-on or unilateral-type broadcast productions. From 2015 onwards as part of their V8 Supercar coverage V8 Media required an on-site production facility capable of delivering a high-end multi camera production from every race. In answer to that requirement Gearhouse built HD9, a truck that could immediately provide a state of the art production facility particularly geared to integrating fully with their existing HD5 supertruck on every V8 round.

HD9 was also specifically designed to incorporate on-board camera systems, radio microphone and IFB systems, handheld radio cameras, UHF communications, on air graphics equipment and the operators and technicians who had previously been out-boarded into multiple site sheds.

The requirements for HD9 were two-fold. Firstly to unite and integrate all the elements - AC, technical UPS supported power, routable audio and vision monitoring, failover redundancy - so that they would benefit from being systemised and operated under OB truck conditions and secondly to provide a state of the art production facility suitable for the Fox Sports V8 Supercars production. HD9 also brought with it a new way of working for Gearhouse's clients. With modern add-ons, downstream or unilateral broadcast productions, the requirement for physical cameras and hardware in the field is lessened as the host or upstream facility houses much of this requirement. However the unilateral OB facility as far as production personnel space, communications capability, workflow, monitoring, processing and QC are concerned needs to be catered for as though in a much larger facility.

With HD9 Gearhouse has been able to optimise the facility for the high-end unilateral or down-stream style production whilst incorporating several specialist areas of broadcast commonly related to bigger events and have avoided tying up space and resources in housing unnecessary equipment that would commonly be associated with an OB unit of this physical size.

From a technical standpoint HD9 really stands out in terms of its flexibility. Whilst HD9 follows the Gearhouse model of standardising the OB trucks core systems by utilising Sony MVS-7000X VMU switchers, Lawo mc²56 audio consoles, Riedel communications matrices and Miranda NV hybrid routing matrices the truck can be used in many different configurations. As well as being a fully standalone OB facility capable of 14 cameras and 4 EVS 8 channel XT3 replay servers with associated hardware, HD9 also houses equipment and operational areas for the deployment of up to 18 wireless camera systems, 16 combined and filtered UHF communications bases and 12 channels of wireless microphone and IFB equipment with multi-fibre optically connected and combined receive site capability for all RF systems. The additional incorporation of up to 9 VizRT graphics engines and associated IO and processing makes HD9 an incredibly powerful live production facility.

HD9 can be a small truck with a large production area, a supertruck or a hybrid truck with all the RF bells and whistles. In building it in the multi-purpose way Gearhouse has built the truck they are able to deliver a bespoke product that their clients require for their specific productions every time. ***www.gearhousebroadcast.com/au***

OBPod being loaded into 747

OBPod Production Gallery

OBPod Audio Pod

OBPod on Location

Sky Sports takes the lead in using Gearhouse's new OBPod for its F1™ coverage

Lighter, more flexible solutions with no compromise on quality

Sky Sports is one of the world's leading sports broadcasters. It holds television rights for many of the most sought after sporting properties, including the English Premier League, Ryder Cup, international cricket and Formula 1™ motor racing. Since its launch in 1991, Sky Sports has transformed the way Britain watches sport, and the fortunes of many of those sports that it covers. As a business it was early to recognise the power of live content when it comes to winning viewers and keeping them engaged. Since Sky Sports began televising Formula 1™ in 2012, it used a bespoke portable flyaway production kit designed and built by Gearhouse Broadcast's systems integration team. For the 2015 season, Sky Sports wanted a solution which was both smaller and lighter – making it much easier to transport. To do this, Gearhouse needed to reduce the amount of equipment and infrastructure needed at each circuit. This had to be done with no compromise in the viewer's experience. Quality needed to remain the same.

A robust, lightweight broadcast solution

Gearhouse Broadcast took its original flyaway concept that had served Sky Sports so well for its first three Formula 1™ seasons and refined it to deliver a lighter, more flexible and future-proof solution called OBPod. The project's requirements also became its mantra. *'Lighter, more flexible solutions with no compromise on quality.'*

Gearhouse's SI team carefully selected every component, fixture and material within the new solution with weight in mind, while ensuring it could still stand up to the rigours of shipping all around the world. The team also took steps to reduce its on-site rigging and break-down times by pre-installing every element possible. This brings about additional cost savings and cuts the amount of time crews are required for at the circuit. Working closely with long-time coach building partner A Smith Great Bentley, and using the standard air freight AMP rectangular container footprint to simplify logistical admin, Gearhouse moved away from the previous honeycomb casing, and opted instead for a lighter aluminium frame. One of the big savings made both in terms of weight and rigging time was by switching from copper to fibre connectivity between pods and external areas. Now less cabling is required, rigging is either sped up or no longer needed.

OBPod Production Gallery

Compact and effective technical workflow

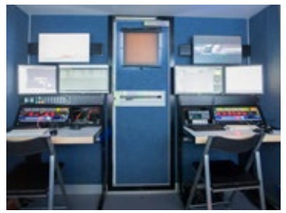
The OBPod flyaway solution consists of five interconnecting pods: an EVS operational pod, an audio pod, an edit pod, a production gallery and an MCR to house the entire broadcast infrastructure. Three of the pods have been designed with expandable sides, similar to an OB truck. This means when being shipped, the pods fit the AMP container footprint and when on site expand out into a specific formation to provide a dedicated area for Sky Sports within the TV compound. This design gives crew additional space and provides a more comfortable working environment to operate in.

A post-production infrastructure has also been integrated within OBPod. It includes four EVS XT3 ingest, playout and replay servers, and a migration of Sky Sports' existing edit system to Adobe Premiere Pro CC. This is linked to a 500TB Dell SAS RAID storage system running on a 10Gb fibre network. There's also an on-site EVS IPDirector system integrated with Adobe Premiere Pro CC for ingest control, metadata management, on-the-fly editing and playout scheduling.

The communications matrix is based around a Riedel Artist 128 digital matrix, configured for up to 16 client cards and software. The dedicated audio pod is based around Genelec monitors and a Lawo console equipped with 80 faders. All the monitors within OBPod have been pre-installed so don't require separate flight cases to travel – these would always need additional storage space when on site. This provides significant time-saving in not having to set up and pack away any monitors before and after each race. Due to the complexity of the infrastructure and the mission-critical nature of what OBPod is required to do for Sky Sports, the design, build and systems integration has been a painstaking and lengthy process. No stone has been left unturned in the quest to shave as much weight as possible from the kit. While this was happening, it was important to ensure that performance levels are guaranteed.

Sky F1 Server Pod

OBPod Operational Pod



OBPod EVS Back Deck

Sky Sports on the importance of the OBPod mantra

Sky Sports director of operations, Keith Lane, who has been involved in the design of OBPod from the outset, said: "Reducing transportation costs has been central to our thinking in terms of the production infrastructure that we take on the road for the Formula 1™ seasons. Given the busy calendar and distances between circuits, costs can really mount up over a Championship, so with the use of OBPod, we expect to make substantial savings in 2015 and beyond."

"Gearhouse's original flyaway solution has served us well, so we didn't want to change too much in terms of workflow and set-up," Lane continued. "We did, however, feel there were areas in which savings could be made both in set-up/break-down times and shipping costs. It's been a fascinating process to follow OBPod's development. The decision to adopt the standard AMP rectangular container footprint and the comparison of the size, weight and performance of the elements within it is something that should always be considered for this kind of flyaway job."

"It's also been interesting to see what can be pre-installed so it doesn't have to be broken down and reinstated, race after race. When you spend as long on the road as our F1™ crew, anything that can cut the amount of time they have to be at the circuit is very welcome."

Lane concluded: "In essence, Gearhouse has taken everything within our previous flyaway pod and refined it to deliver a lighter, yet more flexible and future-proof solution without compromising on performance or functionality. This has been an ambitious, yet ultimately rewarding project, both financially and from an engineering and systems integration point of view."

Following acceptance testing and systems training at Gearhouse's headquarters in Watford, OBPod made its debut for Sky Sports at the opening grand prix of the 2015 Formula 1™ season in Melbourne, Australia in March 2015.

'Kings of the Jungle' – Gearhouse provides worldwide broadcast facilities for I'm a Celebrity

I'm a Celebrity... Get Me Out Of Here! is a reality programme first produced by ITV Studios for UK audiences. First aired in 2002, the show puts a group of celebrities into the Australian jungle where they have to complete challenges and 'bushtucker trials' to receive rewards like food. Now the format has been exported to a number of countries around the world, Gearhouse Broadcast has been called upon to provide broadcast facilities in some of the remotest jungles on earth. The UK and German versions of the show, produced by ITV Studios for ITV and ITV Studios Germany for RTL respectively, take place in the Australian jungle.

The challenges presented in producing a TV show from the jungle aren't to be ignored – notwithstanding the fact that these live transmissions took place almost every day for nearly six weeks. "We love being a part of I'm a Celebrity... It's always about building a robust, hard-working production workflow from nothing," said Kevin Moorhouse, coo at Gearhouse. "After so long providing ITV Studios with the facilities they need, we feel really at home in the jungle. We've done all the shows for a number of years – that's a testament to the solutions we've consistently delivered."

Gearhouse on location for I'm a Celebrity... Get Me Out of Here!

I'm a Celebrity... bush tucker trial

I'm a Celebrity... Get Me Out Of Here! (UK) ITV Studios

In 2014, Gearhouse returned to the jungle for the seventh year running to deliver technical production facilities to ITV Studios' I'm a Celebrity. HD flyaway solutions were installed at the show's permanent jungle home for the series alongside a brand-new facility. This newly constructed building housed a production gallery where Gearhouse installed production furniture and equipment including a 15-monitor video wall of 32" Samsung screens fed by Evertz VIPA16-DUO multiviewers. It also featured the 288 x 288 Pro-Bel (Snell) video router which was upgraded to handle 384 x 576 outputs.

I'm a Celebrity... Get Me Out Of Here! (Australia) ITV Studios Australia

The first series of the Australian version of the show took place in 2014 which meant a brand new production base was required. In the South African jungle which was set to be home to the series, Gearhouse's Project Solutions division built this facility from scratch. The production facilities for the show benefited from 18 Sony HDC-1500 cameras with Canon lenses and 13 Hitachi DK-H32 cameras with Egripment Minishot pan and tilt heads. There were also 13 Sony HD MiniZooms in IR mode for night-time shooting. The Lawo MC 56 and Yamaha MC7-48 sound mixers support the Sennheiser MKH-416 and Sony ECM 88B microphones in place for audio recording.

Ich bin ein Star – Holt mich hier raus! ITV Studios Germany

Based in the same jungle as the UK version of the show, Gearhouse has provided production workflows and technical support to the German edition of I'm a Celebrity... since its third season in 2008. In 2014, it ran back-to-back with the Australian version – albeit in different locations – so Gearhouse provided crews to work across the shows simultaneously. These production facilities use the same cameras and sound mixers as the Australian version with additional Lectrosonic UM400 and MM400 waterproof radio mics. "Running major productions back-to-back is obviously a challenge but we have a huge amount of experience in delivering solutions to multiple events in far-off locations which run so close to each other," said Simon Atkinson, technical projects manager at Gearhouse. "The hostility of the environment is always a factor we have to consider when planning for I'm a Celebrity... but we always have full confidence in what we're delivering."

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2014 BNP Paribas Masters

Australian Open 2015

Game, Set and Match for Gearhouse at worldwide tennis tournaments

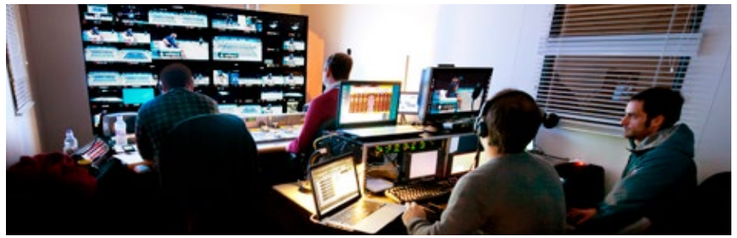
Gearhouse Broadcast has a rich history with tennis having provided broadcast facilities for all four majors - Australian, French, US and Wimbledon - as well as on the top two tiers of the prestigious ATP World Tour. This includes the nine Masters 1000 tournaments that take place in venues around the world including Indian Wells, Cincinnati, Toronto, Miami, Shanghai and Madrid and the 13 ATP World tour 500 events that include tournaments in Dubai, Barcelona, Rio de Janeiro, Acapulco, Beijing, Tokyo and Queens in London.

At the 2014 Barclays ATP World Tour final at the O2, ATP Media hosted a 4K production test covering all 30 matches from the year end finals. Gearhouse provided production facilities utilising Hitachi SK-UHD4000 4K cameras – the first 50 of which were bought by the company at IBC 2014. During the tournament, 4K content was viewable on a 65" Sony Bravia screen in one of the O2's VIP bars. All Singles and Doubles matches from the eight-day event at the O2 were captured in 4K and produced and directed in a room built around two EVS XT3 servers and a Vizrt Viz Engine rendering engine. Real-time graphics were provided by MOOV and a video compositor and a Ross Video Acuity vision mixer were also installed for the trial.

The facilities Gearhouse provides for this – and other tennis tournaments – are tried and tested. The audio suite centred around a Lawo mc256 console with a Yamaha LS9 in place as backup. Monitoring was provided by Genelec 1830s and a single 1090 for the director's reference. Audio was transported from the courts as uninterrupted MADI streams. Ingest and content sharing was handled by an EVS-dominated inventory and featured 12 XT3 servers, seven EVS IPDirectors, five EVS XTAccess and one XFile station. Included in this were three Cisco switches and 40TB of NeuLion storage. There was no denying that the 4K element at the Barclays ATP World Tour Finals caused a great deal of excitement at the event. With ATP Media constantly striving to innovate and improve its coverage, Gearhouse is continuously evaluating the footage to see what ideas can be fed into future trials.

Tennis tournaments Gearhouse has provided facilities for include:

French Open since 2011
Australian Open since 2005
Wimbledon since 2001
US Open since 2010
ATP World Tour Masters 1000 since 1999
ATP World Tour Masters 500 since 2010



Production Gallery - Barclays ATP World Tour Finals 2014

Audio Production - Australian Open 2015

SloMo Production Area - Australian Open 2015

Gearhouse Rentals Division

With physical space for storing kit at a premium and capital expenditure to purchase equipment not always available, many production companies and OBs choose to hire kit. Any production or programme can present technical requirements which are above the capability of equipment already purchased. Gearhouse Broadcast's rental division is a well-established supplier of production solutions for live events and can comfortably supply all genres from sport and light entertainment to dramas and documentaries. It offers an equipment rental solution that's cost-effective, practical and fits exactly with a production's specific needs. The dedicated rental team at Gearhouse has an extensive working knowledge of all kinds of broadcast equipment and can provide clients with a professional quality service which is combined with excellent engineering support, 24 hours a day, 7 days a week.

By hiring equipment from Gearhouse, production companies or outside broadcasters can save time and money by saving on paying equipment managers to maintain kit. All of Gearhouse's rental equipment is maintained to the highest standards by its in-house engineering department and is carefully prepared and tested before every job.

In a production workflow where each piece of kit does something very specific, the cost of purchasing equipment quickly becomes prohibitive to a production company or OB. Equipment hire from Gearhouse allows for a flexible workflow. It means companies can always design a workflow specific to a production's needs. The range of kit available from Gearhouse means that programming is producing using the latest, most up-to-date equipment. It negates companies needing to constantly upgrade or sell older equipment or invest in new equipment. Renting kit also alleviates the need for any kit to be stored onsite by the production company - especially when space is at such a premium in city centre facilities.

Gearhouse on location at Emirates Stadium

The X Factor presenters Ant and Dec

The logistics of shipping kit from one place to another is something that adds time and money to any shoot. Gearhouse's transportation and logistics department can deliver locally and nationally to any studio or location. Shipping internationally is also easily arranged so equipment will reach productions on time, in optimum condition and ready for purpose wherever it is in the world. When renting from Gearhouse, each piece of equipment also comes complete with a fully robust, custom built flight case ensuring the equipment reaches you in excellent condition. This gives producers the ability to focus on the mission-critical elements of the shoot.

Gearhouse's portfolio of projects is a testament to its ability to provide the best facilities. It includes credits of prime time, long running successful programmes like The X Factor, Britain's Got Talent, Celebrity Juice, Top Gear, Champions League, The Oxford and Cambridge Boat Race and Wimbledon. Clients include outside broadcasters SIS Live, CTV, NEP Visions, Telegenic and XL Video. Studios including The London Studios, Fountain Studios, The Hospital Club, Maidstone Studios and Pinewood Studios and major independent production companies such as Talkback Thames and Endemol. Gearhouse provides equipment hire of lenses and accessories, vision mixers and routers, tripods and accessories, EVS servers, system cameras and channels and camcorders and accessories.

Gearhouse Actis – an RF Services company designed for the Broadcast industry

In July 2014, Gearhouse owner Gravity Media Group acquired ACTIS HF, the French radio frequency (RF) transmission specialist. Now the basis of a broader broadcast rental, sales and systems integration offering to French and French-speaking customers, ACTIS HF took the name GearhouseActis. Founded in 1991, the company has delivered high-end wireless transmission systems for leading broadcast and security customers including BBC, Canal+, Eurosport, Globecast, TF1, France24 and the French Ministry of Foreign affairs.

Its major credits include the French Open tennis, French elections, the investitures of President François Hollande and President Vladimir Putin, the Istanbul Marathon, F1 H2O World Championship powerboat racing, the finish of the Vendee Globe 2013 and Euro 2012. It has since worked with the Gearhouse teams on the 2014 Asian Games and the Australian Open tennis. From dry hire to full set-up services, GearhouseActis is a specialist in integrating microwave equipment including RF cameras, on-board cameras, point-to-point links and motorbike and helicopter links.

Case studies
Project: 2014 Asian Games
Client: Mito (Incheon host broadcast management)
For the 2014 Asian Games in Incheon, South Korea Gearhouse Broadcast delivered production services including a complete wireless camera solution from GearhouseActis. It provided RF support to six different sports throughout the tournament – athletics, aquatics, gymnastics, football, the marathon and the visually dramatic opening and closing ceremonies. Events were held around the city so camera feeds for Mito were fed wirelessly to Gearhouse's facilities at the Songdo Convensia. Each event had different requirements so GearhouseActis' versatility in delivering wireless coverage was key. These six events were covered by 12 cameras, including eight on Steadicam rigs, each equipped with Vislink L1700 transmitters and L2174 receivers. Most significantly, GearhouseActis spent time

with Gearhouse Broadcast engineers developing a unique solution for the Hitachi SK-HD1200 camera systems. Previously not used over RF, the firmware of the cameras control units was upgraded and GearhouseActis built specially designed brackets to fit wireless transmitters onto the cameras.

Project: Luanda Saint Sylvestré 10km race 2014
Client: Televisão Pública de Angola (TPA)
The 59th Luanda Saint Sylvestré race – run on 31 December 2014 – marked the sixth year in a row where RF facilities were provided by GearhouseActis for the national TV coverage of the event. GearhouseActis was contracted by Televisão Pública de Angola (TPA) to capture the event with uninterrupted blanket coverage. GearhouseActis installed RF uplinks on three motorbikes and one helicopter. An aerial relay was mounted in the same helicopter and one receive point was installed on the ground.

Cameras operated from the motorbikes and the helicopter were fitted with a Vislink L1700 transmitter and GearhouseActis 5W power amplifier. They were live-mapped using GPS transmitters which gave the exact location of cameras ensuring seamless reception of feeds. The relay system in the helicopter was fitted with three Vislink L2174 receivers, another 5W power amplifier. This in-helicopter relay took all four camera feeds and sent it to a ground-based receiver point. The receiver points featured a high-gain dish antenna, four Vislink L2174 receivers and an autotracking antenna with an automated engine. A wireless link validation through an SDI matrix meant that signal feeds were only played out when a GearhouseActis engineer validated the link quality.

Project: 2014 UIM F1 H2O World Championship series
Client: H2O Racing

For the 2014 UIM F1 H2O World Championship powerboating series, the 'flagship' of single-seater inshore circuit racing, RF specialists GearhouseActis delivered live wireless on-board camera footage from the boats, enhancing the overall viewing experience. Due to the high-performance levels of the six-metre-long, 390kg catamarans, the integration of the on-board cameras and transmitters required close collaboration with the competing teams and boat manufacturers at each race weekend.

Each vessel was fitted with a waterproof bullet-style miniature camera to capture external action, and there was an additional camera positioned in the enclosed cockpit focused on the driver. The feeds were transported via Vislink XPu HD and Vislink L1700 on-board transmitters to Gigawave antennas connected to L2174 receivers. Due to the heavy vibrations, sudden shocks and sea-spray of the boats, GearhouseActis also designed a bespoke water and shock-proof housing for the transmitter.

Project: 'Je suis Charlie' solidarity march in Paris
Client: M6 / BFM TV

In the wake of the Charlie Hebdo attacks in Paris it was vital that the sheer scale and historical importance of the occasion was captured in the fast-paced live news coverage. French broadcaster M6 and the 24-hour television news channel BFM TV called on GearhouseActis to provide fast deployable live ENG kits. These included wireless cameras, intercoms, radio microphones and N-1 in-ear monitors for the roving reporters to keep in touch with their colleagues back in the studio as events unfolded.

Due to the many news crews on the ground within the city, there was a high demand for spectrum space so GearhouseActis had to carefully manage its allotted frequencies and adapt its RF systems to ensure there was no interference from other links. GearhouseActis supplied six wireless newsgathering cameras that were in operation on the ground in central Paris. These flexible and robust links gave M6 and BFM TV real-time coverage of the events taking place in some of Paris' most recognised landmarks like Place de la Nation and Place de la République.

Project: Apostolic journey of his holiness Pope Francis to Turkey
Client: Nev Production / Inter Signal

In November 2014, Pope Francis visited the historic city of Istanbul to meet with government and religious figures. RF specialist GearhouseActis was called in by producers to deliver aerial shots of the papal procession and the city to help demonstrate the enormity of the occasion.

A helicopter-mounted camera was integrated with an RF system for this low-altitude coverage. Housed inside the helicopter was a transmitter which sent the camera feed to a crane-mounted receiver on the ground. This was fitted with automated GPS tracking which meant that as the aircraft moved within a 30km range, the in-helicopter transmitter was always pointing in the right direction. GearhouseActis' solution of tracking the helicopter's movement meant there was no loss of signal to the receiver – ensuring a reliable live link to the camera mounted on the aircraft. Being able to provide a bird's eye view of a topical event like this gives perspective to the settings and enriches the storytelling of the news report.

www.gearhouseactis.com/en

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Gearhouse Broadcast LLC

Gearhouse Broadcast LLC has been a force in the USA's outside broadcast and live events market since 2002. The company has an impressive track record of delivering live broadcasts with unique challenges often incorporating cutting edge technologies being used in difficult environments. Gearhouse Broadcast LLC specialises in the supply of high quality mobile (OB) trucks, Rapid deployment/high capacity Fly Pack systems and bespoke production systems that have a significant RF component. The company has particular credibility in purpose built solutions such as studio Installations and complex workflow live delivery

With a wide range of products and services on offer Gearhouse Broadcast LLC quotes major North and South American broadcasters, production companies and global brands as diverse as the World Surf League (WSL), Red Bull, the Hollywood Bowl, TED, the LA Philharmonic, San Francisco Ballet and the Los Angeles Opera as their clients. In addition to providing broadcast facilities Gearhouse has also led the way in new technology innovations within its field such as the world's first RF HD jet ski now commonplace on surfing tours. The company has a policy of not following the crowd but instead leading and innovating hand-in-hand with their clients.

As a full one stop shop Gearhouse offers its clients the opportunity of not using many different suppliers on productions. Their comprehensive offering has also helped make some of the most challenging live events friendly and engaging for both Gearhouse's clients and their viewers.

Examples of technically challenging productions include the 2014 WSL Fiji Tavarua event where Gearhouse shipped all its equipment on boats to a small island in the South Pacific. From the island the equipment was then transferred to the surfing reef and the event, complete with all live production equipment, cameras, engineering and RF went without a hitch. Even more remarkable was the fact that the full 3G TV production, despite being on a remote island, used a single Gearhouse-designed Fly Pack and the broadcast including RF was full 1080P 60. A world first.

Gearhouse was also responsible for the Placido Domingo concert that closed the 2014 FIFA World Cup. This event, in addition to using a fully equipped mobile OB truck was also broadcast to 72 countries across multiple time zones with Gearhouse managing all the satellite requirements.

Finally in the world of extreme sports Gearhouse is no stranger to the challenges and sheer audacity it takes to make these events a success. One of the more extreme extreme sports events is the Red Bull Rampage mountain bike challenge which tales place 4500 feet up on near-vertical iron shale ridges near Virgin, Utah. Putting on a production in this environment is no mean feat especially when the main RF camera is in a helicopter and there are cameramen 5000 feet up the mountain capturing all the action. With Gearhouse setting up two RF cameras at base camp 1000 feet below there are seriously long runs of fibre connecting the production. As far as dangerous and tough productions go, they don't come more challenging than the Red Bull Rampage.

As all Gearhouse's productions prove their much-heralded in house RF expertise is very much a unique selling point for the company. Where most facilities providers need to go to third parties Gearhouse can design, build and integrate complex and bespoke RF systems into any production or discipline as required.

www.gearhousebroadcast.com/usa

Gearhouse Broadcast offers dedicated solutions to drive the Middle East broadcast bonanza

As broadcasting grows at a rapid pace in the Middle East, Gearhouse Broadcast's Qatar arm is delivering the infrastructure to power the burgeoning Middle East media sector. Gearhouse Broadcast Doha was established in 2008 in response to this increased demand and as a result provides services including systems integration, permanent and temporary cable installations, stadia and arena upgrades and OB truck builds and installations. Local personnel in Qatar understand the business landscape of the region and work regularly with a variety of clients from broadcasters and studios to stadium and venue operators. The base gives Gearhouse the ability to offer the highest standards of broadcast installations to what is a quickly emerging market.

Providing a winning solution

Upgrading sports facilities to support HD broadcasting is essential for such a fast-evolving media sector like Qatar, but replacing this kind of infrastructure is quite a challenge, particularly in terms of cabling. Gearhouse Broadcast has continually proved to be up to the task however. All four of the football stadia in Doha: Al Gharaffa, Al Rayyan, Al Sadd Sports Club and the Qatar Sports Club, have benefitted from upgrades to HD by the broadcast engineering specialist, as has the Khalifa Tennis and Squash Centre complex in Doha. As the preferred supplier to the Qatar National Olympic Committee, Gearhouse Broadcast and associate company AV Tech had previously completed a number of broadcast cabling and audio visual contracts at various sports arenas, but the challenge with the four football stadia was a full upgrade from SD to HD. Such a task would encompass 115 wall boxes, and a considerable amount of SMPTE hybrid fibre, HD video and audio and network cable. Harris distribution and conversion equipment was installed, along with Tektronix video test equipment, Bel audio test equipment and Belden and Draka audio and network cable. Each venue was assigned a dedicated installation team, enabling the HD upgrade to take a mere two months to complete.

Keeping Al Jazeera on-air

When busy 24-hour rolling news channel Al Jazeera had to have its main studio renovated at its Doha headquarters, it needed a temporary studio from which to broadcast – however the switchover had to be seamless. Due to the continual output of the channel, the transition also had to require only minimal external technical support to ensure continuity was maintained. Gearhouse Broadcast, which has worked with Al Jazeera previously on a number of projects, including its coverage of the 2008 Beijing Olympics, provided the design, equipment and crew for the new studio, as well as full on-site training for Al Jazeera's production team. Gearhouse then upgraded the temporary studio to a ful-HD operation. All stages were completed without any disruption to the output. The new studio is equipped with seven Sony HDC-1500 camera channels, three EVS XT3 production servers, four EVS IP Director production asset management systems, three Final Cut Pro edit suites and a Snell Sirius router. A Thomson XtenDD35 production switcher was initially installed, and then replaced with a Grass Valley Kayenne video production software platform as part of the subsequent HD upgrade.

Answering the call for content

The Middle East broadcasting boom doesn't just encompass sports stadia and media companies, houses of worship are also becoming involved in media creation for TV networks and require the infrastructure to deliver it. For example, Gearhouse Broadcast delivered a complete, high-specification, turnkey broadcast installation at the State Mosque of Qatar in Doha, believed to be the biggest mosque in the Middle East. The installation was configured to provide a connection for Qatar Television's live broadcasts, where QTV would depend on the mosque for live feeds in every occasion during Ramadan Eid, Adha Eid and every Friday during praying time. The Broadcast Control Room at the State Mosque was fitted with a Sony DVS 9000 vision mixer, Harris routing, glue and Inscriber graphics, as well as Sony VTRs, and a Miranda Kaleido multi-viewer driving six JVC 42 LCD display monitors. A Soundcraft BB100 audio mixer, was supplied, installed into bespoke Custom Consoles technical furniture. Five Sony BVP-E30 system cameras, supplied with a mix of Canon J35 and J22 lenses, were supplemented by ten Panasonic AW-E860 cameras with Canon YJ20 lenses on hot-heads. Panasonic remote control cameras provide extra coverage of the main Mosque area.

Planning for the future

Gearhouse Broadcast continues to carry out major installation, systems integration and consultancy projects in the Middle East. With this excellent track record in both engineering and operations, the company is uniquely placed to advise on and implement broadcast solutions to suit every content producer. ***www.gearhousebroadcast.com/qa***

SKYLINE TELEVISION

TV SKYLINE

LIVE PORTRAIT

Flight Pack

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TV Skyline on Tour with DSDS

Since 2002 "Deutschland sucht den Superstar" (DSDS) is the most prestigious, successful and longest-standing talent show on German television. Therefore the finale shows count among the most important and strongest quoted RTL-live-shows. Now - for the first time in the 13-years of DSDS history - the finale shows have been produced outside the Cologne studios. Under the slogan "Deutschland sucht den Superstar on tour" the shows this year took place at unusual locations: on the Idalp in Ischgl, at the Balver cave and in the impressive glass hall of the new Leipzig Trade Fair. The highlight was the "greatest DSDS finale ever" which was produced in the sold out Bremer ÖVB Arena.

The technical general management and coordination of the finale shows were taken over by René Alles and Norbert Garske of the best boys tv-factory GmbH, who on their part engaged TV SKYLINE as their technical service provider.

Deutschland sucht den SuperStar

Quotation TV Skyline: "Working with our colleagues from the best boys turned out as a perfect match starting with the production planning up to the actual realization of the production and especially in the areas of technical planning, configuration and construction and dismantling logistics."

Quotation best boys: "When searching for our technical partner TV SKYLINE could convince particularly with the Flight Pack in addition to the very comfortable Ü7 used for show productions. The concept is well conceived and it does not compromise compared to an OB Van. With TV SKYLINE we felt very comfortable regarding the equipment and the implementation."

TV SKYLINE used the OBVan Ü7 - completed in 2014 and one of the most modern OB Vans in Europe - for the production of the two final shows in Balve and Leipzig. The shows at Ischgl and the ÖVB Arena were realized with the high-end Flight Pack production which was also built last year. Because engineering and production were located at Ischgl in a lift station at the height of 2320 meters on Idalp the construction and dismantling logistics turned out as a particular challenge. The production effort with 12 cameras, more than 30 monitors, an EVS and 8 VTRs put high requirements on the Flight-Pack production which had to work like a big OB Van, but could be transported only by gondola and snow groomers.

Due to the weather conditions in April, the show at Ischgl developed into an interesting mix of show and winter sports production. Thanks to the excellent preparation and coordination in advance and the good cooperation with the lift operator, the material transport and the necessary cable tubes could be arranged quickly and easily. Quality standards and the spatial situation made it necessary to distribute the various production areas on three floors. Sound production found a room on the top floor at the back of the house, vision production and vision control were next to each other situated in the middle floor, and the MCR with all technique racks, routing matrix and vision mixers were housed in the basement. In Ischgl the system proofed the test to use fiberglass connections between production and vision control and the MCR. Without extensive cabling requirements the equipment could be distributed on three floors, and the operators escape from the noise of the MCR. In a metal workshop of the lift operator the production desks were set up. Equipped with a large monitor wall and a second row for editing and EVS operators it left nothing to be desired.

Also for the up-to-date biggest DSDS finale show in the Bremer ÖVB Arena the TV SKYLINE Flight Pack was adopted. The production has been housed in a 4-on-1 container, in order to provide the needed workstations/workplaces for about 20 colleagues in one room including a leather sofa. That way the workstations could meet very flexibly the needs of the customer.

In addition, two more containers were used for vision control and sound production. The set-up time of the Flight Pack system was about a day which is similar to the set-up time of an OBVan. Between the various equipment racks only few cables are necessary because the devices with most signal exchange requirements (routing matrix, mixer, multiviewer) are compactly built into a single double-rack. The connection between technical equipment racks and production desks was realized via 3 glass fibers.

Having had the production desks and the equipment racks in different containers provided the necessary sound insulation. Finally there was no "container-feeling" because of racks with colored lighting and high quality designed workplaces. Again, the TV SKYLINE Flight-Pack could meet easily the requirements of a large show production with 11 cameras, about 60 monitors, 2 EVS and 7 VTRs. "The production of the DSDS show of Ischgl and the DSDS finale in Bremen confirmed last year's decision of TV SKYLINE to build a high-end flight pack system by packing a large OB Van in boxes to handle top quality productions at ease."

The four final shows of the 12th season of "Deutschland sucht den Superstar" constitute a further tessera in the show portfolio of TV SKYLINE. "This week in May with the greatest DSDS finale ever, we refer to jokingly as our RTL-show week, since the OB Van Ü7 was allowed to produce simultaneously "Gottschalk's big birthday party" in Berlin."

Flight Pack Total View

Sound Desk

Equipment Racks

Production Desk

SloMo Control

Vision Control

TECHNICAL SYNOPSIS

Transportable Control Room

Flight Pack

Cameras & Lenses

- Up to 24x Broadcast Camera Sytems
- Cable sets for Ikegami, Sony and Grass Valley Systems
- Canon and Fujinon Lenses are available

Video Equipment

- Snell Kahuna Videomixer
- Snell Sirius 830 3G/HD/SD Hybrid Audio/Videorouter
- VSM Control System from L-S-B
- KVM Switch from IHSE
- Multiviewer from Axon
- Character Generator, Teleprompter
- Up to 2x VTR
- Up to 3x EVS

4x Stageboxes over Fiber

- Video 8in/8out
- Analog Audio / AES
- 4x Riedel ports
- 2x RS 485 Interface
- 1x Public WiFi
- 1x Ethernet VSM

Technical Data

- No of Cases: up to 49 pieces
- Total Weight: up to 9,2t
- UPS: 25 min. Autonomy
- Power Requirements: 32A CEE
- Video Formats: 3G/HD/SD
- Audio Formats: Stereo, Dolby 5.1

Audio Equipment

- Lawo mc²56 MKII Audio Mixer with 48 Faders
- Dynaudio Speakersystem
- Genelec PFL Speakersystem
- Audioprocessing with TC Electronic System 6000
- Wohler Audio Controller

Intercom

- Riedel Artist 128 x 128 Matrix
- Duplex Radio, Simplex Radio
- Motorola Radios

Photo © Ivan Garcia

ONE TV'S MOTOGP COVERAGE ASSISTED BY RTS INTERCOMS

The Italian broadcast specialist ONE TV is relying on RTS intercoms to support its MotoGP coverage for Sky Italia, including an ADAM-M mid-size modular intercom matrix, color display keypanels and microphones. Millions of viewers worldwide follow each event in the MotoGP calendar. In addition ONE TV has already secured a further assignment for three races of the Superbike World Championship.

The Road Racing World Championship Grand Prix is the premier championship of motorcycle road racing worldwide. Among the three racing classes, MotoGP is the highest and most prestigious. In 2014, Sky Italia launched a dedicated MotoGP channel, which airs all events live from Thursday through to Sunday evening.

Photo © Jorge Lorenzo

Providing the feed from the race sites to Sky Italia for the five seasons is the responsibility of the Italian broadcast specialist ONE TV. "Live productions are always challenging, as you only have one shot at getting everything right," says Rosario Castaldi, Senior Account Manager at ONE TV. "For the MotoGP, we also need to bear in mind that our whole system has to fit inside two flight cases." The tight schedule of the MotoGP calendar poses a further challenge: "Some months, races are held on consecutive weekends. The scant time available for setting up and breaking down the system is therefore an extremely important factor."

Photo © Nicky Hayden

"The basis for our work is communication," says Castaldi. "Without being able to speak to one another, we would be unable to implement productions successfully." To assure communications, ONE TV brought in Professional Show, RTS partner and Italy's largest system integrator. Together they devised a communication system built upon RTS equipment. An RTS ADAM-M mid-size modular intercom matrix – equipped with MADI, VOIP-enabling RVON and analog cards – constitutes the heart of the system deployed each weekend. These are connected to a total of ten KP 32 CLD and KP 12 CLD color display keypanels along with three DKP 16 CLD (color display desktop) keypanels and an EKP32CLD expansion keypanel. RTS gooseneck microphones complete the mobile installation.

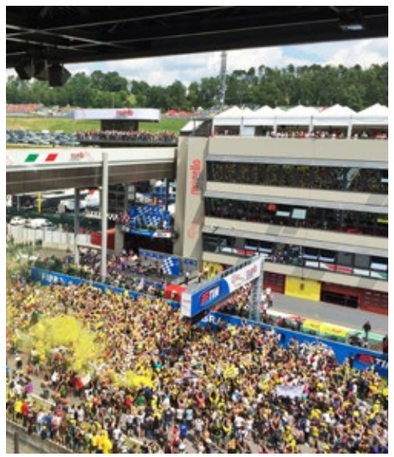

Photo © Lorenzo Patoia

"The intercom equipment from RTS is highly flexible and delivers first class performance – qualities essential for any live production," explains Castaldi. "What we especially appreciate during the MotoGP is the fact that the system is easy and quick to set up. With MADI on board, we can integrate the system into the audio networks on site using standard cabling. The RVON system additionally allows us to become an extension of the Sky Italia system through trunking."

The performance of the systems has been so outstanding that ONE TV is set to make broader use of them. ONE TV is currently developing another flyaway system. The mobile production room will include 24 cameras and all the equipment needed for the host broadcast production of the three Superbike races outside Europe. Rosario Castaldi: "In view of the fantastic experience we have had with RTS, it's obvious that RTS equipment will be on board."

For further information, please visit
www.rtsintercoms.com

OB TEAM

SCREEN MEDIA

LIVE PORTRAIT

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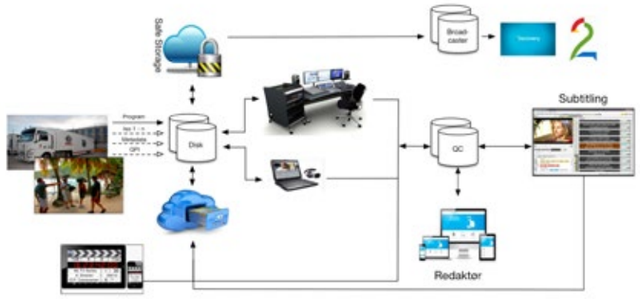
This is Screen Media

Screen Media has been established as a one-stop-shop production centre for TV and multimedia production. The need for live pictures increases rapidly- both within and outside the media industry. Screen Media is responding to this new reality with a considerable new investment.

The company's focus is "Create once – Publish everywhere". This shows Screen Media's ambition to deliver content to all distribution platforms. The company is concentrating on the market for Media companies and other companies outside the Media industry who wish to broadcast TV and live pictures.



Screen Media focuses on TV and live pictures. Effective production flow from production to multi-platform distribution is the priority.

Owned by OB-Team

Screen Media is owned, established and has been developed by OB-Team which was started in December 1991. Traditionally OB-Team has worked with Outside Broadcast (OB) services with broadcasters as sole target group. In addition to OB-Team's wide spectrum of services, Screen Media will also offer services in the business-to-business sector and cover rights-holders' need for live streaming and OTT distribution.

SCREEN MEDIA

In addition Nydalen Studios is part of Screen Media. Nydalen Studios concentrate on studios of varying sizes primarily for the professional TV industry.

NYDALEN STUDIOS

OB-Team is owned by EBU member TV 2, Norway's largest commercial broadcaster. The company works with both national and international customers.

With eight OB buses and associated vehicles OB-Team has one of Scandinavia's best OB fleets.

Outstanding OB-Buses

Since its foundation the company's primary activity has been Outside Broadcast. OB-Team is a full service facilities provider for TV production. The company provides the technical expertise necessary for large light entertainment productions, game shows and sports events.

Despite Norway being a relatively small country with few TV viewers the demand for technical quality and reliability is as great as in other much larger TV markets. In this situation versatility is as important as being a niche supplier to a specific type of production. OB-Team has consequently placed emphasis on dynamism and flexibility within our personnel and in creating our TV buses.

Uncompromising

OB-Team is uncompromising where quality is concerned and our flexibility is a competitive advantage for our customers.

OB-Team has a wide-ranging experience from large and small concerts, dramas and sitcoms, game shows and most types of sport. Our portfolio of completed and ongoing productions serves as a guarantee for the quality we produce and our service to our customers.

OB-Team currently has eight buses which all in all is one of the most modern bus fleets in the Scandinavian market. These buses suit diverse sizes and types of TV projects.

OB-Team is high and low. Here from the Nordic skiing World Cup in Falun, Sweden in the winter of 2015.

HD 2 with tender truck

Vision Control

Sound control with Studer Vista 8 sound mixer

Picture control with EVS operators

This is HD 2

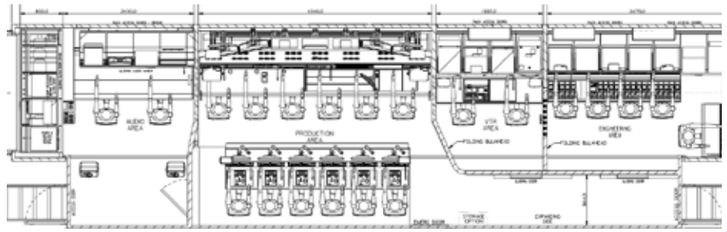
HD 2 is OB-Teams flagship. The OB bus produces signals in several HD formats and has sound control that satisfies all demands made by the largest music productions. HD 2 is thus well-suited to larger concerts and other types of event which demand the best sound and picture control.

With space for 24 cameras, 4 camera controllers and 6 slow motion operators, HD 2 is able to cover most large TV productions. Great emphasis has been placed on comfort and flexibility in HD 2. The working environment is light and welcoming and it was a priority to ensure the workspaces are open and airy.

Buses with accessories

HD 2 has its own specially-made trailer which works as both a store room and transport vehicle for all peripheral equipment needed e.g. for sports events. The chassis was made by Moeyersons in Belgium and the technical installation was carried out by SONY Professional Services in Basingstoke, England.

Store Room in Tender Truck



TECHNICAL SYNOPSIS

HD 2

OB Van

Video

- 24x Sony Cameras HDC-1500
- Wireless Camera Adaptors from Gigawave and Vislink
- Connectors on Cameras, CCUs and Cables: Lemo Fibre
- Lenses from Canon, all Focal Lengths available
- Vision Mixer Sony MVS-8000A, 4M/E
- Character Generator VizRT with Engine – Trio - Artist
- Monitor Wall with Sony LCDs
- Up to 8x Sony VTRs, XDCAM HD, HDCAM SR
- Up to 7x EVS HD Disk Recorder XT3 6ch
- Frame Stores: integral part of the Vision Mixer
- Video Matrix: Sony HDS-X5800 198x272

Audio

- Studer Vista 8 Audio Mixer with 52 Faders
- Studer Audio Routing Matrix
- Monitoring: Genelec 5.1 Surround Sound
- Trinnow Optimizer MC
- Dolby E encoder/decoder/audio tool
- Recorder: ProTools HD 64 Channels
- Microphones: on customer request

Intercom

- Matrix: Riedel Artist 128x128
- Wireless Talk-Back: Riedel
- ISDN Codec: Youcom

Coach Built

- Weight: 39t
- Length: 18,00m
- Height: 4,00m
- Width (stowed): 2,55m
- Width (expanded): 3,80m

Special Features

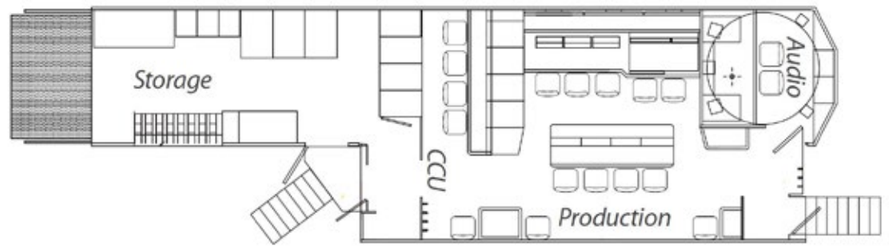
- Dolby 5.1 in Production Area and in Audio Area

HD 3 is Europe´s first 3D OB bus

Production at a sports event

Use of Cineflex at a mountain bike event

HD 3 in production



This is HD 3

HD 3 was the first OB bus in Scandinavia which could produce live 3D broadcasts. The OB bus is tailor-made from front to back and from floor to ceiling. Our design team has covered every inch of this OB bus to make it one of the most flexible OB buses in Scandinavia.

3D Engineering Area

Sound control with Studer Vista 5 sound mixer

OB-Team's more than 20 years' experience lies behind this production bus- a fact which gives an advantage to both our experienced technical team and our customers.

We have placed emphasis on flexibility and comfort for our customers and associates. The workspaces are light and pleasant giving a feeling of space and openness even when working long hours in this OB bus.

HD 3 has its own store room where peripheral equipment such as stands, cases, cables and similar can be stored safely. Given this, additional vehicles are seldom needed. This is an environmentally-friendly and cost-effective solution.

TECHNICAL SYNOPSIS

HD 3

OB Van

Video

- 19x Sony Cameras HDC-1500R
- Wireless Camera Adaptors from Vislink
- Connectors on Cameras, CCUs and Cables: Lemo Fibre
- Lenses from Canon, all Focal Lengths available
- Vision Mixer Sony MVS-7000X, 2-8M/E, 4ch DME
- Character Generator VizRT with Engine – Trio - Artist
- Monitor Wall with Sony OLED LCDs
- Up to 4x Sony VTRs, XDCAM HD, HDCAM SR
- Up to 5x EVS HD Disk Recorder XT3 8ch
- Video Matrix: Miranda NVision 8500 200x256
- Router Control: VSM from L-S-B

Audio

- Studer Vista 5 Audio Mixer with 42 Faders
- 3 Madi fibre connections for stagebox
- 1 Madi fibre connection for 64-channels
- ProTools i/o
- Monitoring: Genelec 5.1 Surround Sound
- Trinnow Optimizer MC
- Dolby E encoder/decoder/audio tool
- Recorder: ProTools HD 64 Channels
- TC Electronic Systems 6000, 4 engines

Intercom

- Matrix: Riedel Artist 128x128
- Wireless Talk-Back: Riedel
- ISDN Codec: Youcom

Coach Built

- Weight: 30t
- Length: 16,00m
- Height: 4,00m
- Width (stowed): 2,55m
- Width (expanded): 4,5m

OB-Team invests in SNG

SNG is one of OB-Team´s major areas of interest

TECHNICAL SYNOPSIS

SNG 9 HD

OB Van

OB-Team and contribution

Satellite transmission - SNG (Satellite News Gathering) - demands precision, effectiveness and high quality in addition to competence. After taking over TV 2 News' SNG-division OB-Team has become Norway's leading and most experienced SNG operator.

Our 2 SNG vehicles and DENG units send every day news, sport and entertainment to Norwegian and international TV stations. We can also produce and send on behalf of companies and organisations' meetings, conferences and PR events. In addition to SNG and DENG OB-Team also handles broadcasts via fibre and Public IP, in addition to LiveU and others.

TV production equipment

16x16 HD & SDI Harris Router
14:4:2 Audio mixer
UHF radio set
In-air monitor sender mounted in the car
Electrical needs: 32A

UpLink Equipment

Antenna: 1,9m ND SatCom
Dual 750W Ku-band (13.75-14.5 GHz) Hpa
Comms via sattelite
2 MPEG4 and 2 MPEG2 simultaneous transmission
3 Streams simultaneously receive channels

Generator

SNG 9HD has a back-up generator:
Fischer Panda at 12,5 KVa.
10kVA UPS-system. Victron Energy transformer on electricity

Signal standards

HD/SD Encoder 4:2:0 & 4:2:2
Inputs: HDSDI, SD SDI and analogue PAL and NTSC
HD Video bit rate 6 til 90Mbps
Support for Dolby 5.1, Dolby-E & DTS pass through

Coach Built

Weight: 2,95t
Length: 5,9m
Height: 3,05m
Width: 1,99m

CONTENTS

Production of «Strictly Come Dancing» in Studio A.

This is Studio A, Norway´s largest broadcast studio.

Reception for Studio A, B and C

TECHNICAL SYNOPSIS

Nydalen Studios

Studios

This is Nydalen Studios

Nydalen Studios consists of 3 modern studios. Studio A is Norway's largest studio built specially for broadcast.

The studios are mainly used by traditional TV channels but also for others working with streaming of TV content. The studios have good ceiling height with rigs for mounting lights, walkways over the light grid for easy mounting of ceiling equipment. The studios have their own cooling systems with UPS and back-up electrical generators. All studios can be accessed directly from street level. In addition there are facilities such as make-up room, painting and carpentry workshops, crew room, sewing room and canteen. The public have their own reception.

For the studios there are 1500 lamps available in different categories, a good choice of dimmers and a High End Systems Full Boar 4 light desk. Studio A has Norway's largest blue screen which can be set up upon request.

This is Studio A

Studio A is well-known as Norway's nicest and best-equipped studio. Studio A is located in Nydalen in Oslo. Located adjacent is Studio B and Studio C.

This is Studio B and C

Much of Norway's entertainment production is made in Nydalen studios in Oslo. This studio complex has good capacity and offers professional facilities for everything from traditional shows which go digitally to broadcast stations with "shiny floor shows".

When Norwegian TV channels want to make good entertainment for their audiences of around 5 million they often use Nydalen for the productions.

Production in Studio B.

Broadcasting from Studio C

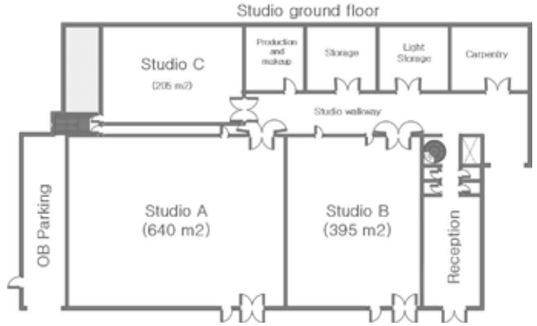
Broadcasting from Studio B

Studio A

Measurements floor:
gross 28.5 x 22.5 metres
Measurements floor inside horizon:
27 x 21 metres
Height: 10.30 metres under Grid/Cat walk,
18 hoist systems with truss bars
(Expandable if needed)
Vehicle entrance at street level:
Height 4 metres. Width 3 metres.
Black and white horizon.
Height 120 metres. Length 60 metres
Level concrete floor on sound-absorbing
base with protective layer on top.
Standard colour NC 6500 - grey
Patch field for Audio/Video/data/Telephone
Electricity: 315 Amp, 13 pieces., 63 Amp 400 V

Studio B

Measurement floor:
gross 17,5 x 22,5 metres
Measurement floor inside horizon:
16 x 21 metres
Height: 10.30 metres under Grid/Cat walk
12 hoist systems with truss bars
(Expandable if needed)
Vehicle access from street level:
Height 4 metres and width 4 metres
Black and white horizon:
Height 10 metres and length 50 metres
Level concrete floor with protective layer on top
Patch field for Audio/Video/Data/telephone
Electricity: 225 Amp, 8 pieces, 63 Amp. 400V.



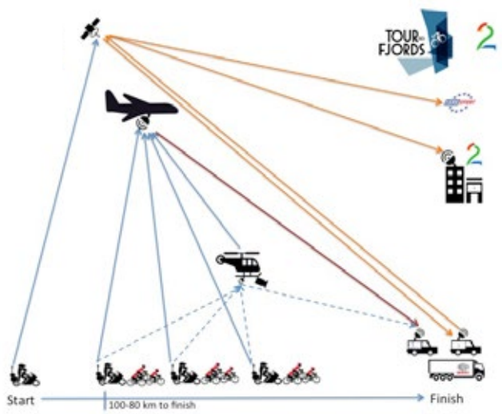
Studio C

Measurement floor:
gross 17 x 12 metres
Measurement floor inside horizon:
15 x 10 metres
Height: 5.30 metres under Grid/Cat walk
5 metres under light grid
Black and white horizon:
Height 5 metres and length 30 metres
Level concrete floor with protective layer on top
Patch field for Audio/Video/Data/telephone
Electricity: 160 Amp, 4 pieces, 63 Amp. 400V.

«Tour des Fjords» - cycling production along the coast of Norway.

Cineflex from a helicopter.

Cycling co-production with «Dutch View».



Different vehicles were used to cover the race. Tour Des Fjords and Tour of Norway has provided OB-Team with invaluable experiences.

OB-Team and cycling

During the summer of 2015 OB-Team has been fully focused on Tour des Fjords and Tour of Norway. This is an international cycling race which has quickly developed a high status in the world of international cycling.

Deep valleys and high mountains bring major challenges for cabling and access in order to bring cycling productions where the wild nature of Norway challenges the world's elite. Creative solutions have solved all challenges and the TV images sent internationally have been a great advert for both Norway and cycling.

"We produced TV from the tightest valleys and the deepest fjords, in the most amazing scenery. Covering cycling has been a fantastic journey for us" said Per Arild Berge in OB-Team.

All types of vehicles and units were used during the coverage in order to create the best TV images; cars, motorbikes, planes, drones and helicopters were all used during the five day-long race in Western Norway.

CONTENTS

BSKYB – WHERE SUSTAINABILITY MEETS KVM

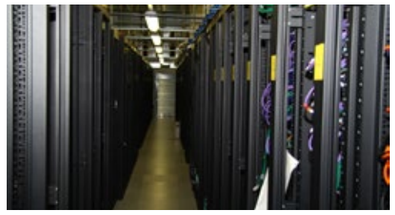
A contribution to the future – It's a fascinating and imposing building, the new Sky Studios of British Sky Broadcasting (BSkyB) in West London. Located at the company's headquarters, it is considered Europe's most sustainable broadcast facility. The HD studio, post-production house and broadcast control centre employs more than 1,300 people. The staff's talent, hard work and enthusiasm are the driving forces behind BSkyB's success.

Where many people perform at their best, space is a valuable good.

To move computers out of the employees' ways in order to create space, BSkyB deploy KVM products from German Guntermann & Drunck GmbH on all four floors. In data rooms with more than 400 server racks, KVM extends and switches the signals of more than 1,000 computers to improve work conditions for both employees and hardware. Each floor at Sky Studios is the size of a football field. They are all packed with cutting edge equipment as BSkyB's main focus lies on efficient operation to provide their customers with the best service. To describe the amount of KVM installations would go beyond the scope of this user report.

G&D's part in the project

When planning the new studio, Design Manager Peter Charles and System Design Engineer Martin Richards faced the challenge of having to remove computers from studios and workplaces. In his previous job, Peter Charles has had positive experiences with extender products of German Guntermann & Drunck GmbH (G&D). One of the outstanding USP G&D offers is the zero-latency movement of the mouse, as well as the ability to switch without delay. Charles' satisfaction and the equation of price, performance and quality led to the decision to apply G&D products.

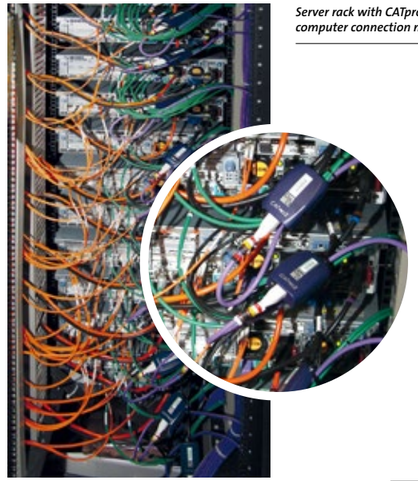


BSkyB's high density of KVM

Sky Studios run about 1,000 servers to achieve best results. By placing servers in separate, access protected and air-conditioned server rooms, studios and workplaces remain free from computers, noise and emissions.

Easy access for maintenance

To access the computers, they are interconnected by several KVM systems, mainly matrix switches. Firstly being based on analog VGA systems, BSkyB later-on migrated the matrix installations to by then available digital matrix installations. These DVICenter systems quickly were expanded by four large 288-ports ControlCenter-Digital matrices. As all those components are compatible with each other the recent systems were added easily. Even for the combination of the VGA-based CATCenter NEO into the digital matrix systems G&D provides the "Bridge Function": this allows for a consistent user interface for easy operation. KVM



Server rack with CATpro2 computer connection modules

systems consist of a transceiver and a receiver which run without having to install any additional software. Even the operating system in use doesn't play a role. Transceivers and receivers are connected using either CAT cables or fibre optics.
For remote access, KVM even goes one step further. Computers are linked to the UCON-IP-NEO system that gives access to the servers from every workplace connected to the LAN or the internet. This allows administrators to fix computer issues at any time from anywhere – as long as a web connection is available.

Challenges of moving servers during live operation

In broadcast all equipment is somehow "exotic". KVM systems always face a heterogeneous environment in which they have to fit in. At Sky, however, all components perfectly adapted to the system without causing issues during installation. The biggest challenge for Peter and Martin's team was implementing the devices during operation. Broadcasting runs 24/7 – and cannot be paused because of some servers that need to be moved.

Fortunately, G&D components are plug & play devices.
G&D KVM matrix systems offer:

No defined switch-on sequence
Connection during operation; computers do not need to be switched off
Stay-alive function as computers remain unaffected when switching on and off or when "moving" a switching component
Automatic detection as system components can be plugged in, unplugged or moved while the computers are in operation

The future is in the sky

BSkyB's goal is to achieve long-term, sustainable success that creates value for their shareholders and has a positive impact on society. According to their policies of sustainability, BSkyB selects its suppliers and products carefully. Guntermann & Drunck is proud to be part of BSkyB's future-oriented vision.

Peter Charles, Design Manager @ BSkyB
"G&D's KVM slide in – and you forget about it; no trouble, no complaints from the operators."

Customer
BSkyB serves more than 10.5 million homes through the most comprehensive multichannel, multi-platform television service in the UK and Ireland. They continue to break new ground with their broad range of own channels. Also they work with dozens of other broadcasters on the satellite platform, as well as online and on mobile. BSkyB has led the UK into the age of high definition television, launched Europe's first 3DTV channel.

Partners
Omnio Technologies was founded in 2001 and is now established as a leading Value Added Distributor of digital and analogue KVM solutions. Their technical sales team provide coherent, customer-oriented individual expert advice from planning right through to After Sales Support.

Sony is a leading global manufacturer of audio, video, communications and information technology products. Their mission is to bring new technologies, content and services and enhance people's lives.

Project
Moving 1,000 servers into remote server rooms using G&D's KVM installations, spread across 4 floors

Challenge
Removing computers from 5 HD studios, 45 edit suits, 14 voice-over studios and 4 audio suits while daily broadcasting needed to continue; meeting the needs of a sustainable surrounding that cares about the well-being of the staff, but requires highly reliable KVM solutions

BSkyB runs four modular ControlCenter-Digital matrix switches with 288 ports each.

With G&D's RackConsole17 HD drawers, the IT team can access all computers from the server rooms. Here, over 100 RackConsoles are installed to facilitate maintaining or fixing computers without interrupting the productive staff in their work.

There's no need to bother with the infrastructure: When handling a number of computers at a time the G&D CrossDisplay-Switching is of great help. Without the confusion of manifold peripherals the systems can be operated by a single set of keyboard and mouse. For switching the keyboard-mouse-focus from one computer to another the user simply needs to move the mouse pointer to another screen. This allows for intuitive and quick operation.

Products
KVM Extenders
DL-Vision, DVIVision, CATVision, DL-Compact

KVM Switches
DVIMUX2, miniMUX

KVM Matrix Switches
ControlCenter-Digital, DVICenter, CATCenterX2, CATCenter NEO with UCON-s, UCON-IP-NEO and CATpro12, RackConsole17

Customer benefits
The KVM solutions extend and switch the signals of more than 1,000 computers. The result? Workspaces with room for daylight and fresh air for "happy, creative people", and the creation of "ideal working conditions" for IT maintenance and computers.

ATEM SWINGS THE RESULT ON ELECTION NIGHT LIVE

The General Election of 2015 not only confounded expectations of pollsters and delivered shock results, it also provided the opportunity for Sky to offer viewers a unique insight into how a major broadcaster covers such a huge event.
Coming live from the Sky News studios at Osterley in West London, Election Night Live was an ambitious broadcast project on Sky Arts that covered the news channel's General Election coverage from 10pm to 8am through the tense election night on May 7. The most remarkable fact is that the whole ten-hour live Sky Arts broadcast was produced from a small studio at Sky News, normally reserved for creating regular three-minute news summaries for the broadcaster's digital outlets. Studio D is an 'as live' production area where the Sky News team create bulletins in real time. The bulletins are shot in HD using a green screen and virtual studio setup, consisting of three fixed Grass Valley cameras. At the heart of the setup is Blackmagic's ATEM 2 M/E Production Studio 4K, which was to prove essential during Election Night Live, delivering real time switching, vision mixing and routing for the Sky Arts show.

A mammoth undertaking

Studio D was chosen as the base of operations for the Sky Arts coverage of Sky News, but the mammoth undertaking would need extra kit. However that wasn't to be an issue as the room had been designed and built with flexibility in mind.

"When we were specifying this small studio we didn't have a huge budget, but we needed a space that could be as capable as our main television channel, in as much as it could be," said Stanford. "It was going to be staffed by multi-skilled personnel, rather than dedicated vision mixers, operated by just two people rather than twelve."

"We ended up going almost completely Blackmagic throughout the programme chain," added Stanford. "The Blackmagic ATEM 2 [M/E Production Studio] 4K was vision mixer of choice as well as their 2 M/E broadcast panel, for familiarity for the vision mixer.

Stepping up to the mark

Election Night Live was the brainchild of Head of Sky News, John Ryley. He proposed that it would be really interesting for viewers to be able to see the Sky News team put such a massive current affairs programme together and what election night is really like behind the scenes.

According to veteran Sky News presenter and producer Martin Stanford, the idea already had something of a precedent on Sky Arts. The channel had gone backstage at the opera performance of La Bohème as it was broadcast live from London's Coliseum.

"Sky Arts 1 broadcast backstage conversations and watched the performers preparing and going onstage, while Sky Arts 2 broadcast the actual opera performance," explained Stanford. "The challenge was laid down to Sky Arts, who agreed to do it again. But to do it all night was something else entirely."

For flexibility we also put in one of the company's Smart Videohub 40 x 40 routers to make sure that everything was patchable - including monitor feeds, our Chyron caption generator, our Vizrt graphics machine and the Apple computers we use to put graphics to air."

"For the normal three minute news summary I go in, read the words and have a colleague to cut the pictures, add them to air and add the graphics, just as if we were on live TV."

Stanford explained. "With the election programme we were faced with the challenge of instead of being a small, capable and very up to date but offline studio, suddenly it was going to take on a task that it was an on-air studio, live and not just for ten minutes, but for ten-hours non-stop."

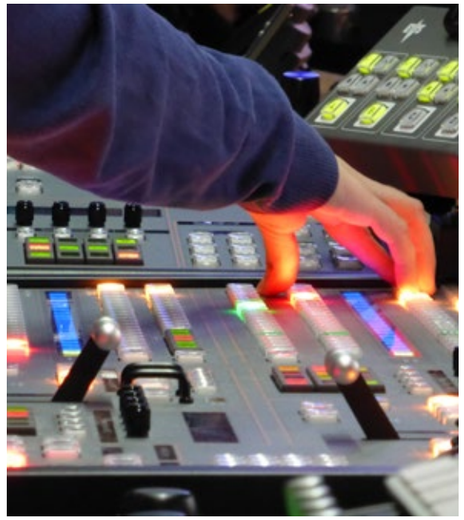
"This was a room in which normally two or maybe three people work in at any one time," added Stanford. "Now we had in there a dedicated sound person, a director, a vision mixer and a producer, as well as my colleague Mark Longhurst, who was the main commentator on the Sky Arts show."

The Reality of Live Broadcast

To cover the broadcast, Sky turned to Camera Corps and its Q-Ball remote camera system, which offers pan, zoom and tilt mechanics in a sphere containing an HD camera. "We placed 25 of those around our building," said Stanford. "They were all over the place, in the control room, in the main gallery, in the make-up room, in the green room and the big engineering centre which we call NOC [news operations centre], where all the feeds come in from various places round the country."

"We didn't want a whole camera crew following me as the roving reporter, so I shot it myself handheld on a little Sony camera," added Stanford. "So Mark threw to me from time to time and I'd just interview a member of staff to find out what they were up to. My HD signal was being encoded by a LiveU radio system, which uses 4G mobile technology to get the data back as a live stream."

To complete the Sky Arts setup, another Blackmagic ATEM 2 M/E Production Studio 4K was installed in Studio D. "So we had two ATEM 2 M/E switchers daisy chained back to back," explained Stanford. "One doing twenty cameras, another handling five further cameras and the rest of the things you need, like VTs, graphics, name supers, and various other things. The vision mixer/director was a bit like a musician at a rock concert - he had to wrap around two ATEM 2 M/E Broadcast Panels to press buttons simultaneously."



Multiple views

The main programme output was created on the ATEM through the SuperSource feature, which offers multiple boxes that can be used to create a DVE look to the output. "We wanted to build up a multi-layered image," explained Stamford. "So we had our main output - there was a graphic around that. Then there was some text information overlaid on top, and the live Sky News feed in a box in the top right of the screen. We had a basic steel grey environment design on which the two boxes – main Sky Arts output and Sky News output - were sitting, and then on top of that we used a graphics engine to create our information straps. We also had to run bumpers to go into the commercial breaks, so there were some animated jingles to reach to the end of a programme section and back on air again. That was all run from the internal media player in the ATEM and it all worked very well."

The Sky Arts team knew from a rota which Sky News presenters were in each constituency or the studio. Viewers could watch for example Ed Conway, who was doing video wall routines with statistics and graphics and results in the main studio. "On our cameras we could see him rehearse it, or we could see the shot of the jib camera floating around the news room to get him filmed against the wall. Meanwhile you could actually see what was going out to Sky News viewers at the top of the screen."

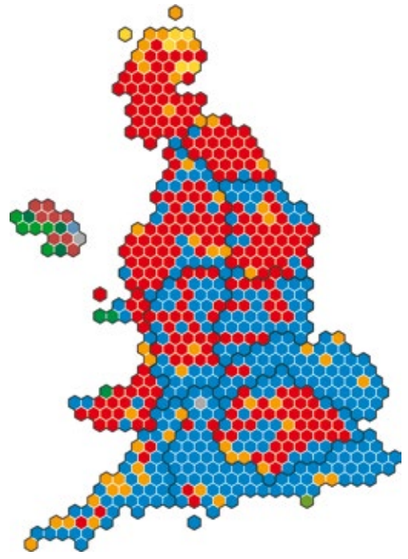
Then there was the idea of tagging the cameras. "We wanted to keep the viewers aware of where we were at any one time, so we labelled the shots for each area we were in. The new macros feature in the ATEM enabled us to set up one button that would cut, change the camera and change the label at the same time, rather than having to do that manually. So when we decided to go from green room to newsroom, or to the make-up area, as the visuals would cut, the label would update. That just made life easier, rather than having to have a graphics operator constantly trying to keep up."

Unparalleled success

Sky had mapped out a number of contingency plans to cover should any part of the live workflow fail, or not perform as expected. These however were never required. "Confidence was high and everyone who had to work with the setup was very pleased with the end result," concludes Stanford. "Election Night Live confirmed Studio D was a flexible space capable of scaling to host a main network programme. The Blackmagic-based studio took on a very ambitious brief and passed with flying colours."

GOING LIVE ON ELECTION NIGHT

For its dramatic coverage of the UK General Election of 2015, Sky News broadcast through the night of the 7th May from a specially created studio at its Osterley studio. From 9pm through to the next morning it would offer live coverage of hundreds of constituencies around the UK, as the voting results were declared. According to Sky News presenter and producer Martin Stanford, the most ambitious undertaking was to get so many of the counts covered.



Sky News developed special software to present the live feeds all over a video wall in the main broadcast studio.

"All those 150 streams were put onto 50-inch UHD screens, with 16 per screen, which formed the backdrop of the whole programme," says Stanford. "You could see it all going on. We could then manage a selection of YouTube streams onto displays and/or cut any single one of them to television, if we needed to show that particular result being announced."

"It was the most ambitious thing we've ever done in terms of live pictures being brought into Sky in West London and by far the biggest."

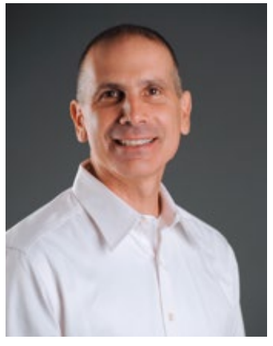
"The idea for the main television program was although our evening anchor person Adam Bolton was the main studio anchor, a lot of the time it was bounced around the country," he explained. "So Jeremy Thompson would report from Ed Miliband's constituency in Doncaster and he'd do a few minutes on air and interview somebody, and then Kate Burley would do a bit from Witney, David Cameron's seat, followed by Anna Botting from Sheffield Hallam, Nick Clegg's constituency. Eamonn Holmes, who does the breakfast show, was up in Sunderland South, which is the constituency which always wins the race to be first to declare."

"We actually had 200 counts altogether," he continued. "50 of those were traditional broadcast, with a journalist to camera, sometimes with a producer there too. However 150 of them were media students equipped with a small Sony camera and LiveU 400 unit. From the LiveU it was streamed up to YouTube. This meant that we were able to show 200 counts at any one time. By putting them up as a YouTube stream it saved them coming into our building and us having to host them. Many of our viewers on iPad or similar could choose to watch their own count and that proved very successful."

A LANDSLIDE VICTORY FOR CELLULAR BONDING

LiveU Portable Uplink Solutions

"Sky 150"
Sky News UK General Election Coverage



Author: Ronen Artman, VP of Marketing

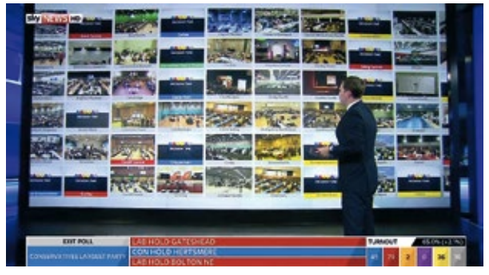
Election coverage is where news broadcasters have a tailor-made opportunity to make their mark. Sky News has led the way with technology, using the 2010 UK general election night as the time to transition from SD to HD, simply because so many people were watching. The broadcaster followed suit with the 2015 general election, delivering 138 live IP feeds from 150 key counts and constituencies countrywide using LiveU's cellular uplinking technology.

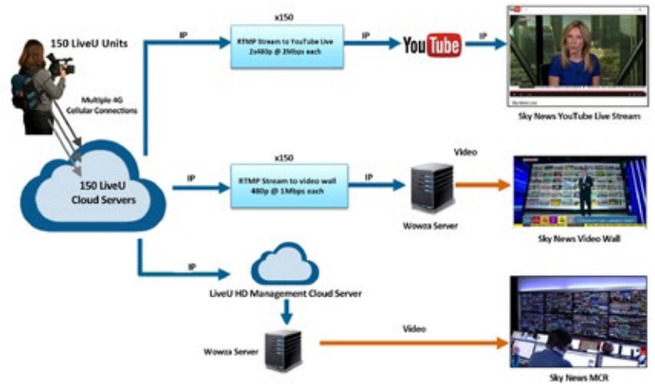
Sky News was keen to replicate and expand upon its coverage of the Scottish Referendum 2014. There it provided additional coverage from 32 locations, using apps and iPads. During early planning stages for 2015, a demo unit of LiveU's LU200 ultra-small transmission device arrived at Sky News HQ. After conversations with LiveU and further internal discussions, it was decided that LiveU units out in the field, providing coverage of 150 constituency declarations at 138 key counts, would give Sky News a unique selling point for its coverage of the election. From December 2014, planning began in earnest.

The Scottish Referendum project provided additional TV feeds as well as online coverage (all 32 locations were streamed live on YouTube) on top of the feeds provided by traditional TV OB trucks, the audio and picture quality were not ideal. When it came to providing coverage from 150 declarations, the Sky150 as it came to be known, the decision was made to use 'proper' hardware units and a proper camera. As Deputy Head of News Technology Richard Pattison explains, as soon as you are talking a project with this scale, you straight away have to work with a partner that has the capacity to provide the 150 units. "Once we saw the LU200, LiveU came to the forefront," he says. It helped that the Sky News technical team was already familiar with LiveU, having been the first user in Europe, and now with multiple units around the world for everyday news coverage.

Pattison adds, "It was a perfect storm. We had a working LU200 demo unit in our hands. It was small, it was neat, it was compact, it could take an HDMI input from a prosumer camera. We knew it was a brand new product, we knew LiveU would be interested in pushing its capabilities, so that was the driver to go with LiveU." Purely for practical reasons, Sky News decided to use both LU200s and LU400s. Also, the LU400 has the advantage of accommodating four SIMs and four modems, giving the option to use one SIM from each of the main mobile providers in the UK. The broadcaster used six LU200s to follow each of the main parties out on the campaign trail through the whole pre-election campaign.

The 138 transmission units were paired with Sony PJ620 Handycams, each manned by a team of trained media students and young journalists. This was in addition to the existing 49 traditional OB trucks providing live feeds to the newsroom – as deployed for the last election – using capacity on an ad-hoc basis from providers Globecast, SIS Live and Arqiva.





New era, new delivery infrastructure, new studio

It was clear from the outset that Sky News could not simply add 138 additional baseband video sources to their existing studio matrix for capacity reasons as well as the associated cost, space and power. So Sky News worked with LiveU to develop a completely new, IP-based, delivery solution that took advantage of ad-hoc cloud infrastructure and heavily utilised software such as Wowza and FFmpeg.

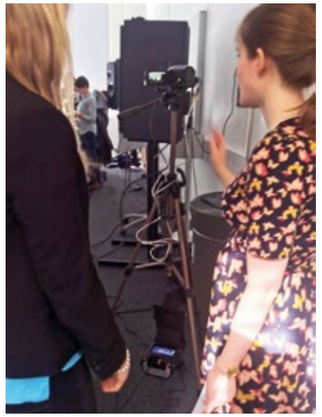
An SD proxy of all 138 LiveU feeds was routed to Osterley over IP, via 138 cloud-based LU2000 MMH servers, each cloud server also steaming its feed live to a YouTube Live Event. Sky News customers were able to access these live streams from the Sky News App and website, enabling a greater choice of live viewing for the customer. Once a count had finished, the live stream was replaced with a clip of that constituency's declaration. Pattison and Smith worked closely with Przemyslaw Pluta, the Head of Creative Platform Solutions at Sky News, to develop bespoke 4K monitoring and switching solution that would utilise and control cloud infrastructure, heavily integrating software such as VLC, FFmpeg and Node.js.

Like most studios, Sky News operates an SDI environment, so monitoring 138 IP feeds required some new facilities. Sky News' Chris Smith, Development Executive – News Technology, used the Wowza media server application running on a MacPro to take the inbound LiveU RTMP streams and make them available within the studio environment as multicast streams. These streams could then easily feed multiple monitoring stacks without increasing the external bandwidth overhead in to the studio. Sky News then built a completely new monitoring environment, utilising 4K monitors.

The solution developed by Pluta and Smith allowed the visibility of all the inbound proxies throughout 4K infrastructure at full resolution. At any point during the election coverage, an HD stream of the four most relevant LiveU SD proxy feeds could be selected via a user-friendly touchscreen, web-based switching matrix and converted to baseband video. At this point the Sky News NOC could make them available to ingest or the gallery. The solution provided audio monitoring and basic information (location details, etc.), meaning producers could easily identify the geographical origin of each video feed. Any changes were distributed in real-time across all connected users and notifications were posted.

Originally designed as an operational command and control facility for the News Technology team, Sky News decided to capitalise on the spectacle of 138 simultaneous live feeds and built a brand new studio around the monitoring solution, from where they anchored their election programme. The new studio enabled the production and technical teams, along with the results team, to see what was going on across all incoming feeds at all the critical counts and consistencies, as well as providing a dynamic backdrop to our election coverage. Compared to older black box systems, IP provided Sky News with an enormous amount of flexibility. As Pattison explains, "It does create challenges in that you are trying to operate in an environment that's set up for baseband video, but if you can overcome those challenges, it gives you any amount of flexibility."

As the icing on the cake, Pluta and Smith took full advantage of the multicast streams with 150 live feeds used as a static and scrolling feature across the Sky News UHD video wall.



Powerful results

As Pattison explains, it wasn't just the LiveU units that made the difference on the night. LiveU Central, LiveU's unified management system, was very important to the whole operation and was used in an innovative way. He says, "We used it to name all the feeds for the producers, then we could also monitor which units were no longer in use because a count was completed."

Thanks to LiveU Central, the technical team could easily track the status of modems, Ethernet ports, what connectivity was being used, or whether a unit was connected or not. It made technical support very simple as all the relevant info could be seen and adjustments made.

LiveU's support was also very important to the whole project. According to Pattison, this came primarily in two areas. He saays, "This was a ground up project and LiveU absolutely had to be tightly involved; it's not something we could have done on our own. Support on the night was also important. We're a team of two people, so just to have our partners from Garland Partners Ltd. and a couple of the guys from LiveU was extremely helpful. Because of the remote capability, between the six of us we were able to quickly get the units up and running."

Summing up the outcome of the night, Pattison says, "We had the added unique selling point of having more live sources than any of our competitors. We were able to take results directly from our LiveU feeds and feed them into the system before other news organisations had them. These were the marginal, key seats that [significantly impacted] the final election results." He added, "We're very happy. It was an audacious project and there were a number of wildcards: the involvement of a large number of students; a large number of locations with varying levels of connectivity; and a relatively small team to pull it all together. It was a lot of hard work, but it was extremely satisfying to see all those live feeds up and running."

Young journalist stringers

Sky News had recruited and trained 270 young journalists as stringers. They were equipped with Sony PJ620 Handycams and a LiveU LU400 transmission unit to scale coverage to more than 270 declarations at 176 locations in total for the election. The basic idea was trialed for the Scottish independence referendum. Sky's technical team, led by deputy head of news technology Richard Pattison, had assembled each camera pack, which contained four sim cards (one for each main network operator) for belt-and-braces connectivity. Since around 20 of the sites didn't provide reliable connectivity, Sky had installed high-speed broadband fibre on location and erected temporary broadband over a satellite dish from Eutelsat service Tooway.

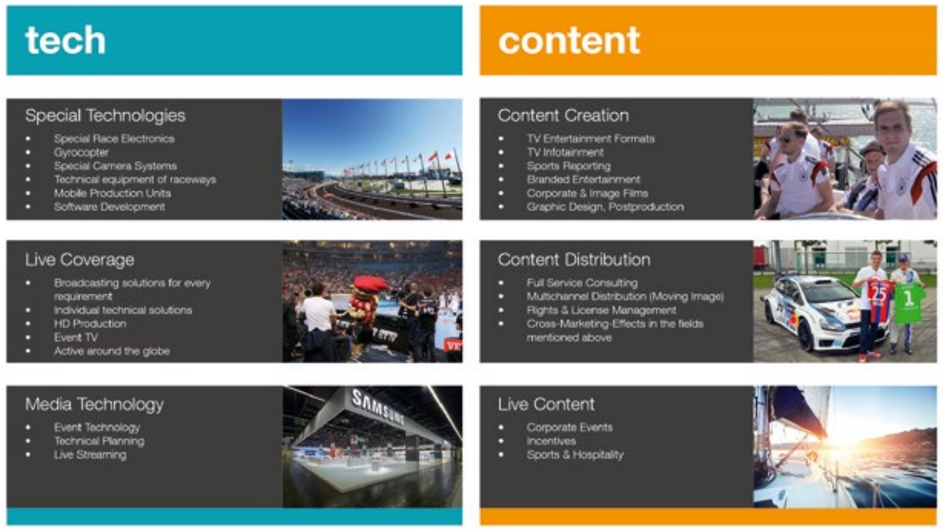
All 150 LiveU feeds were routed to Osterley over IP in what Sky said was the largest IP OB of its kind. Each stream was sent to Google cloud servers and streamed live to YouTube. Simultaneously, an SD proxy was sent to Sky's News Operations Control (NOC) room in Studio B and displayed on 10 4K monitors.

"When our producers choose what they want to put on air, the stream was converted to baseband video and sent to the gallery for playout," says Pattison. "To the best of my knowledge, no one has attempted to stream 150 concurrent live streams over IP before," says Chris Smith, Sky's news technology development executive. "We considered doing 450 but thought that was too much of a stretch this time."

The students filmed the declarations but did not provide commentary. In addition, Sky's NOC ingested 43 satellite feeds from trucks for mixing into the TV broadcast. It was buying capacity for 33 on an ad-hoc basis from providers Globecast, SIS Live and Arqiva.

SIS LIVE DRIVEFORCE

SIS Live is the largest supplier of contribution feeds for election night. It is fielding 39 trucks and staff from its fleet, plus 29 vehicles leased on long-term contracts to Sky, ITV and ITN Productions.
Branded DriveForce, these vans feature an automated, roof-mounted VSAT antenna. The company is also selling satellite capacity and providing 14 additional camera crew, 55 engineers and a trailer with 10 receiver dishes on board.
"Our crew co-ordinates the contribution links, live stand-up and two-ways, as well as managing tape or hard-drive playouts," says managing director David Meynall.
This is the first election to use satellite capacity in the Ka-band, a more powerful frequency than the traditional Ku-band.
"The big advantage is that customers get the flexibility of guaranteed bandwidth but at far lower cost," says Meynall. "DriveForce's design makes for fully automated acquisition of links and simple online booking that frees operators to do other work."



Long-term production partner for the DTM and ADAC GT Masters

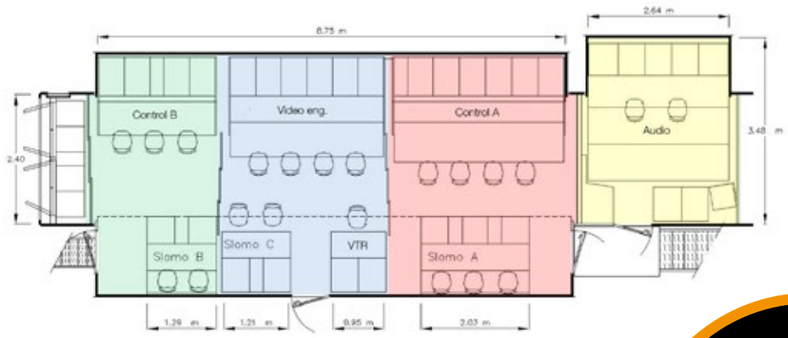
At the start of the DTM season 2015, series organiser ITR and production partner _wige MEDIA AG renewed their cooperation for three further years. The corresponding agreement covers extensive technical and media services. _wige has been active on behalf of ITR since 1992, boosting the strong international profile of the series ever since the start of the new DTM in 2000.

_wige provides high-quality image production from all races (including qualifying) in HD quality. TV partners worldwide receive the live signal along with detailed on-air graphics via satellite and are able to use editorially prepared highlights for their coverage. Viewers can watch the races in selected scenes from the drivers' perspective through on-board cameras provided by _wige. Additionally, moving image material aired on all DTM media channels is designed and rendered by _wige.

Technically speaking _wige operates the timing service, the Fan TV programme which is transmitted around the entire event area, and the event and race safety technology. _wige attends every DTM race with a crew of approximately 150, up to 50 cameras, and multiple production vehicles. The purpose-built devices for on-board images, graphics services, and timekeeping are transported from Germany to events at overseas circuits too. For the coverage of the DTM, _wige deploys both HD OB truck HD_two and VIPER_2, a custom-built multifunction truck with 12 workstations, one control room, one conference area, and one server room. Data are collected, rendered, and converted into various formats in VIPER_2 by a variety of servers and databases. All satellite signals are provided with generated information pages via an analogue and digital HF cable headend. A 64-port KVM matrix allows access to one of the permanent servers from every workstation. An intercom system with wireless connectivity guarantees perfect communications.

_wige will also continue to provide moving image production and media rights management for the **ADAC GT Masters** for the next three years. _wige was first commissioned by ADAC to produce the TV images in 2007, meaning that it has accompanied the 'league of super sports cars' since its debut year. Complementing the live production services, _wige will also continue to supply international TV marketing of the series. The ADAC GT Masters benefits from an expanded national and international TV package for the 2015 season. News, highlights and features focused on the ADAC GT Masters appear on more than 100 TV stations in 210 countries.

HD_one



TECHNICAL SYNOPSIS

HD_one

OB Van

Control Room B

Sound Area

SloMo Control

Vision Control

Control Room A

Video

- 22x Grass Valley LDX Series cameras
- 02x Grass Valley LDK-8300 SloMo cameras
- Wireless Camera Adaptors on demand
- Lenses on demand
- Control Room A
- Vision Mixer Grass Valley Kayak
- with Kayenne Control Panel 4ME, 4ch DME
- Monitor Wall: 12x 32" with Evertz Multiviewer
- Control Room B
- Grass Valley Kayak 2ME Subpanel
- Monitor Wall: 8x 18,5", 12x 10"
- with Evertz Multiviewer
- Up to 10x Sony VTRs, XDCAM HD, HDCAM
- Up to 7x EVS HD Disk Recorder XT2/3 6ch
- System Controller: VSM from L-S-B
- Video Matrix: Evertz EQX 288 x 288 with
- 12x VIPX Multiviewer
- 4x Stagebox, each with 32x HD/SDI in
- + 32x HD/SDI out

Audio

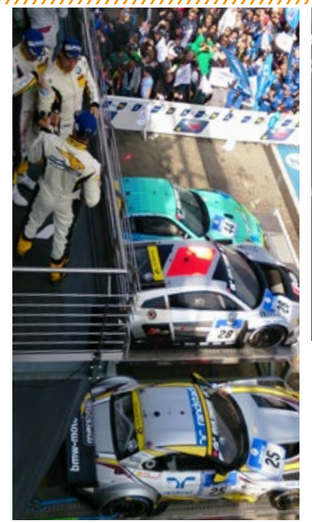
- Audio Mixer: Lawo mc²56
- Monitoring: Genelec 5.1 Surround Sound
- Signal Processing: Jünger Audio
- Dolby E Encoder 4x/Decoder 3x
- Recorder: CD, Event Driver
- Microphones: on customer request
- 5x Stagebox

Intercom

- Matrix: Riedel Artist 256 x 256
- Wireless Talk-Back: Motorola
- ISDN Codec: 6x Mayah Centauri II CII-3001

Coach Built

- Weight: 40t
- Length: 13,75m
- Height: 4,0m
- Width (stowed): 2,5m
- Width (expanded): 4,2m



Ongoing media expansion of the ADAC Zurich 24-hour race of the Nürburgring

24 hours of tremendous speed and action-packed excitement: traditionally, motor sport fans worldwide are treated to spectacular images from the ADAC Zurich 24h race.

_wige creates the perfect setting for the race, which draws over 200,000 enthusiastic fans to the "Green Hell", with TV productions, international marketing, sponsorship packages, hospitality facilities, on-site corporate events, and much more.

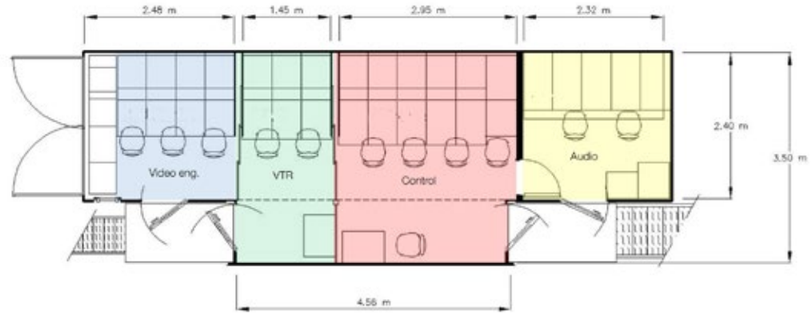
_wige's fundamental and ongoing task is to continue the expansion and development of the internationally renowned motor racing spectacle, staged for the 43rd time in 2015. Alongside a number of firsts in the TV production operation, including production in HD using four OB trucks and fully updated TV graphics, the timing service this year incorporated four split times for the first time. Motorsport fans were kept up to speed with all relevant live timing and lap time data at https://livetiming.tracktime.info/nurburgring, a site featuring a highly attractive and premium design.

_wige also provided a world premiere at the 24-hour race in 2015 with the 4G|LTE Vodafone Livestream, allowing motorsport fans all over the world to follow the event live for almost 26 hours and enjoy the thrills of the racetrack directly on their personal mobile devices.

To deliver the ambitious project, Vodafone installed its own LTE transmitter masts all around the world's longest circuit. Aided by four LTE onboard cameras, an LTE flying drone and Stress Level Monitoring by Get-Speed, a service already proven in the VLN endurance series, fans enjoyed fascinating live footage from the cars and the track. Well-known presenters and six professional motorsport commentators explained and illuminated the event for German and English-speaking viewers.

A total of 1.9 million people accessed the Vodafone Youtube channel to follow the event live from home and at trackside.

HD_two



Inside HD_two

Control Room

Sound Area

Slomo Control

Vision Control

TECHNICAL SYNOPSIS

HD_two

OB Van

Video

- 10x Grass Valley LDK/LDX Series cameras
- 02x Grass Valley LDX-86 SloMo cameras
- Wireless Camera Adaptors on demand
- Lenses on demand
- Vision Mixer Grass Valley Karrera 3ME 4ch DME
- Monitor Wall: 12x 24" with Evertz Multiviewer
- Up to 8x Sony VTRs, XDCAM HD, HDCAM
- Up to 4x EVS HD Disk Recorder XT2/3 6ch
- System Controller: VSM from L-S-B
- Video Matrix: Evertz EQX 230 x 426 with 12x VIPX Multiviewer
- Editing: Final Cut with Live Ingest
- 4x Stagebox, each with 32x HD/SDI in + 32x HD/SDI out

Audio

- Audio Mixer: Lawo mc² 56 MKII
- Monitoring: Genelec 5.1 Surround Sound
- Signal Processing: Digital AES 3
- Dolby E Encoder 4x/Decoder 3x
- Recorder: Audio Workstation
- Microphones: on customer request
- 5x Stagebox

Intercom

- Matrix: Riedel Artist 128 x 128
- Wireless Talk-Back: Motorola
- ISDN Codec: 2x IP Codec AVT

Coach Built

- Weight: 40t
- Length: 12,0m
- Height: 4,00m
- Width (stowed): 2,5m
- Width (expanded): 3,20m

Camera inventory, wireless & special technologies

More than 30 wireless camera systems in HD: _wige is one of the largest providers of wireless technology in Germany. _wige owns more than 30 wireless HD camera systems, which are regularly used to implement demanding projects.

Shorter integration time, maximum operational safety: Up to 16 wireless cameras can be operated from a specially designed vehicle – the RFPU 1. The cameras can easily be integrated into the production facilities, such as the OB truck or the studio, via signal transfer. This procedure minimises integration time while ensuring maximum operational safety. The coverage of the reception area can be maximised via local receiving antennae, even overcoming obstacles such as large areas, buildings or difficult terrain.
Individual solutions: _wige can also provide directional radio links, relays, and other custom wireless technology. _wige's engineers independently develop and implement individual solutions for wireless transmission situations.

_wige _eaglecopter - innovative, flexible, cost-efficient: the _eaglecopter is _wige's innovative and cost-efficient new product for aerial image production. It has the same basic features as a conventional helicopter, but with dramatically lower operating costs. The 'copter seats a pilot and a camera operator, who controls a stabilised pan/tilt head. The _eaglecopter can be used for live broadcasts, film recordings, or as a relay.

Grass Valley LDX Series added to camera inventory: _wige has also expanded its equipment inventory by acquiring a number of new HD camera systems, investing in LDX Series cameras from manufacturer Grass Valley. This product line is an ideal complement to _wige's existing infrastructure and can be applied in a wide variety of situations.

As part of the investment the _wige portfolio now includes an LDX86 camera. This will be offered on the market when not assigned to in-house productions and is available to customers effective immediately on an equipment hire basis. The innovative six-fold super-slow motion camera is deployed in sports coverage to generate footage not currently possible with conventional super-slow motion cameras. The LDX86 provides an attractive alternative, especially when covering very high speed sporting disciplines.

Sochi Racetrack, world leader in race control technology and systems

Alongside live productions from major sporting events, _wige's areas of expertise include equipping and enhancing new and existing international sporting venues. The company worked for more than a year on providing comprehensive media technology solutions for the new race circuit in Sochi, Russia. _wige managed this major project as general contractor from the initial concept and planning stage through to final installation and commissioning. A total of 25 trucks' worth of equipment were transported to Russia where the components were assembled on site into a perfectly configured track control system. The media technology solutions installed at the new circuit included Race Control, video monitoring of the entire circuit, timing, a media distribution system, the starting light gantry and electronic flags, radio links, Voice over IP and installation of the entire data network. The system includes backup power supplies for critical areas and stable Wi-Fi internet access even at periods of maximum demand. _wige SOLUTIONS also installed the circuit's dedicated weather station, loudspeaker system and giant video screens distributed around the site.

At every race, full coordination of the media technologies ensures complete reliability in all critical procedures. Fifty centrally controlled high-speed cameras allow permanent monitoring of the entire track and an immediate reaction in the case of an incident: marshals are alerted by radio, appropriate electronic flags activated or the Safety Car despatched onto the circuit. Measuring loops installed at trackside and GPS transponders in the vehicles supply precise information regarding the exact position of every vehicle. This allows teams to access valuable data in a fraction of a second and provides spectators and viewers with a graphic presentation of the battle for victory.

The timing software developed by _wige provides not only split, sector and final times, but can also indicate whether drivers are obeying instructions from Race Control, for example when overtaking is temporarily not permitted or in the case of potential danger. If there is a tight finish, a high-speed camera generating up to 20,000 images per second guarantees the right driver will be named the winner.

This major project was successfully completed in October 2014 with the inaugural Grand Prix of Russia. The circuit, located within Sochi's Olympic Park, is currently world-leading in terms of race control technology and systems. After scrutinising and approval, FIA Race Director Charlie Whiting described the Race Control facility as "state of the art" and "extremely impressive," providing "absolutely superb" images. Stroi International, the contractor with overall responsibility for construction, also expressed full satisfaction with the implementation of the project.

The dedicated research & development team possessed extensive experience in operating both permanent and temporary motor racing circuits. The team's decades of motorsport expertise guaranteed the smooth and flawless implementation of the project.

Content specialist for sports promoters, leading companies and TV channels

Alongside the technology-oriented live broadcast and special technology sectors, _wige's editorial unit with more than 45 full-time staff boasts wide-ranging expertise in the production and distribution of tightly targeted content stimulating live interaction with major brands.

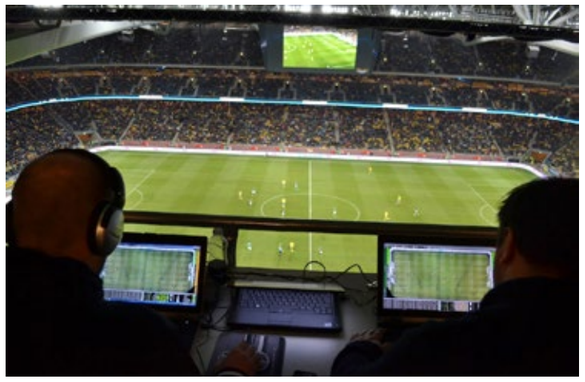
For Volkswagen, _wige documents the action and incidents from every stage of the World Rally Championship, producing webisodes and supplementary image materials throughout the season. Furthermore, the distribution to various online channels is managed and the YouTube channel enhanced with targeted features specifically to maximise reach. In 2015 _wige has again been commissioned to provide editorial coverage of the Red Bull Air Race World Championship. The assignment covers all eight races, with _wige producing extensive content in the form of magazine shows, clips, and also the editorial material for the World Feed. The content is distributed in some 100 countries. In German-speaking regions highlights of every race are broadcast on ServusTV.

ADVANCED PLAYER TRACKING TECHNOLOGY TRANSFORMS LIVE SPORT WORLDWIDE

The idea of tracking player movements on a field or pitch and then using that data to analyze game play is not a new one. But recent developments in digital player and ball tracking technologies are taking the concept to powerful new levels of automation and accuracy, paving the way for much wider usage. As player tracking technology matures, it's being adopted by major sport federations throughout North America, Europe, and Asia.

So what exactly defines digital player tracking? First, we should point out that there are several technological approaches to the concept but the one simple way to distinguish between them is whether they are intrusive or non-intrusive, i.e. whether or not the solution requires instrumenting the actual players to be tracked. Non-intrusive solutions, also referred to as passive, mainly use optical cameras and radar data-capturing technology, whereas intrusive, or active, solutions primarily use radio frequency, GPS, or similar transponders carried by the players or other objects to be tracked. Generally, a non-intrusive method provides a significantly easier implementation path because it poses no additional logistics or health and safety concerns involving the game or the actual athletes.

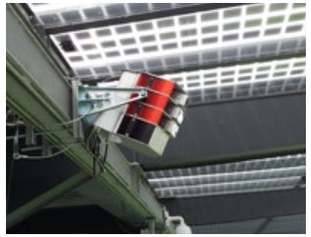
Another way to differentiate between solutions is by latency, i.e. the time from when the actual action happens and the time when the tracking data is available. Early approaches to player tracking, still in use today, involve humans reviewing a game video and following each player, one by one, with a mouse or similar device. This method is very time-consuming and yields a latency of up to 48 hours for a game's worth of data. Latency is the one of the main factors that determines the usefulness of the data, since the longer the delay, the fewer stakeholders stand to benefit.



Player Tracking Applications

In addition to the latency of the output, the application of player tracking data is dependent on the accuracy of the measurements as well as the complexity and logistics of installing the system and making it work.

Tracking data provides keen insight into assessing the metrics of performance and match play such as distance run, speeds, stamina, team formations, set-plays, and other factors. Coaches can use the information to enhance team performance, evaluate team defensive and offensive plays, and decide how best to utilize a player (in isolation or within the team structure). In addition to boosting their own team performance, sport clubs can gain intelligence into competing teams – and the tracking data can play a valuable role in scouting activities both locally and internationally. Athletes and clubs alike can improve their chances of success by analyzing the data to identify strengths and craft strategic and tactical approaches to game-play. For many of these contexts, latency is not a huge issue as long as the data is accurate. Even with latencies up to 48 hours, the data can be of high value to a coach for post-match analysis of tactics and individual performance.



However, the real breakthrough for broad and general usage of player tracking came with technologies that could combine high-accuracy, non-intrusive tracking with true real-time delivery (latency of fractions of a second). This combination allows for the technology to be deployed without the overhead of legal and safety concerns and yields results that can be used not only by coaches and physiologists in planning for an upcoming game, but also to aid in decision-making during the actual game. Perhaps even more important for the widespread acceptance of player and ball tracking systems, the acquired data can bring simultaneous value to coaches and teams as well as to broadcasters, apps, websites, and other live media.

Although the development of player tracking was initially driven by the internal needs of teams and clubs, player tracking data is playing an ever-increasing role in enriching the fans' experience and boosting team revenues. The possibilities range from in-venue large-screen displays for the stadium audience to sponsored broadcast enhancement as well as Web and mobile game-casts. Broadcasters can use the data to tell a better story through graphically enhanced replays or even fully virtual replays where animations recreate player movements. The data can feed across a wide range of visualization platforms, including 3D, interactive, and mobile, to help explain how a match unfolded. On-air pundits and expert analysts can better explain the dynamics of how games have been won or lost, and to empirically support their hunches.

Simple Concept, Complex Execution

Player tracking technology based on an optical camera solution ticks the boxes of low latency, non-intrusive deployment, and accurate tracking. In simple terms, the technology uses optical cameras, located at strategic positions around the pitch or field, to collect real-time video of the playing field. Leveraging advanced image processing technology, the best of these systems can build a digital record of the action, with movement and speed of players, officials, and sometimes the ball or puck from highly accurate X, Y, and Z coordinates of each viewable object with multiple records per second.

As anyone who has seen live TV knows, 2D optical cameras are true real-time capturing devices – but they fall short for tracking objects in three dimensions. Just as it's challenging for people to judge distance or depth with one eye closed, a single camera is not able to analyze an object accurately in reference to its position on the field or in relation to other objects. To overcome this, tracking systems need to either rely on assumptions and multiple video samples (resulting in increased latency) or they have to work in some type of stereo. One camera can provide an accurate two dimensional reproduction – a flat picture – of a scene. Adding another angle means re-introducing the third dimension to the image, from which it's possible to extract measurements to calculate depth and place objects accurately in three dimensions. Although it's a deceptively simple approach in theory, computer vision software has many parameters to consider in becoming a robust tracking solution -- dealing with player occlusions and light changes for outdoor environments being only two. The most advanced systems can produce consistent results across almost all environmental contexts.

The very best of the various active solutions out there are not far behind in terms of latency and accuracy, and this field is seeing explosive development. The main difference between passive and active technologies is that the latter are tracking the position of transponders or sensors placed on the bodies of the athletes rather than tracking the athletes themselves. In tight contact sports, an active technology has an advantage over a passive approach because it is not affected as much by players occluding each other, but as we've said, active systems have the general disadvantage of being intrusive.

The active solutions also have their own share of environmental challenges. GPS in general is not accurate for measurements of less than five feet. GPS technology is also quite sensitive to weather changes and the current amount of available satellites at any given point in time and therefore needs to access additional local references for a robust and reproducible result. With radio frequency-based systems, handling reflections is always a challenge. Radio-based solutions normally use an array of antennas that detect signals coming from transponders on the field and then calculate the position through triangulation. This raises numerous challenges when multiple antennas receive the same transponder signal both from the actual transponder and from surrounding reflexive surfaces.

All in all, there is no silver bullet available and sports organization should choose their player tracking technology wisely. If the system will be used in conjunction with live TV it should preferably be able to operate in the same frame rate as the broadcast system (25/30/50/60 Hz) and even accept external clocking. Also, to facilitate effective use, the system output needs to be able to integrate seamlessly into the existing IT ecosystem of the organization. But first and foremost, the system needs to be proven to deliver a consistent result across all the different environmental conditions it might face in day-to-day operations.

Real-World Impact

While they're not ubiquitous yet, player tracking systems are making their mark on virtually every type of team sport. ChyronHego's TRACAB, for instance, has been installed in well over 100 arenas and is used in more than 2,000 matches per year by major football federations around the globe. ChyronHego's technology is in use by Spain's La Liga, the English Premier League, Japan's J.League, Sweden's Allsvenskan, and Bundesliga in Germany.

In one innovative deployment for sports performance analysis, ChyronHego's Spanish partner Mediapro has developed a coaching tool that combines a real-time player tracking system and video motion analysis tool. With the data from the tracking system presented in an easy-to-access video format, coaches are able to identify anomalies or look for thresholds such as the team's width or depth, or the speed and direction at which certain players sprint at certain times during the match. Furthermore, the data is turned into a real-time 3D animation and is provided though a second screen app that allows the users to interact with the game through control of the virtual camera and through metrics extracted from the player tracking data.

Svensk Elitfotboll, the governing body of the Swedish premier football league Allsvenskan, is looking to adopt the technology as part of its "connected stadium" program to install powerful wireless networks in all arenas and provide richer data not only to coaches and other league personnel, but even to all of its connected fans. The data provides valuable insight for coaches to evaluate player performance, track key metrics, and more. In addition, the player tracking data is used to enhance live television coverage of matches with special effects analytics replays as well as enriching fans' experience through second-screen applications and streaming to arena video walls. We are also starting to see the introduction of solutions with combined tracking technologies. One example is Major League Baseball in North America that has adopted player tracking technology together with a radar-based 3-D ball tracking system to enable precise real-time digital imprints of each play including the positions of all players and the ball. Based on the real-time data feeds from the tracking systems, the sports group is sourcing sophisticated graphics capabilities for its broadcasters in which they can combine real-time data, real-time animations, and real-time video as well as providing the same data bound to broadcast video for instant analytic special effects replays. In addition to powering TV graphics and second screen experiences, sports organizations are taking control of this new content source and extracting new performance metrics for the sport, helping to explain the game and its tactics as well as highlighting the remarkable performances of athletes.

Most commonly, player tracking systems are installed permanently in sports arenas, but the most robust passive systems can also support portable use. In one example, the matches in an Asian football league are covered by a system that can be rapidly installed at each pitch and then just as easily taken down and moved to the next arena. In this manner, the federation expects to cover more than 300 matches during its currently running football season. In addition to its performance analysis role, the tracking system is creating additional revenue opportunities for the federation as new groups of stakeholders – such as sponsors, broadcasters, and other media – discover the data's potential for enhancing fans' experience.

Changing the Game for Sport Organizations

To summarize, state-of-the-art player tracking technologies are enabling an unprecedented degree of field-of-play data acquisition and visualization, both to enhance live game broadcasts and also to support scouting, player development, and performance training. The most robust systems span almost a decade of continued development, and they're currently being deployed across the most demanding live sports environments to cover many thousands of sports events. Everyone from fans in the stadium and home viewers to teams, players, and scouts are reaping the benefits of the rich evaluation metrics and deeper insight into game play and team performance.

by Sören Kjellin, chief technology officer for ChyronHego

Sultanate of Oman TV's transmissions cover the whole country and can be received in the rest of the world either by satellite or via the internet. General channel and sport channel can also be received on mobile telephone.

Oman TV transmits a wide variety of programs that cater for every segment of society and include coverage of events and national occasions. It has five daily news bulletins in Arabic and one in English language. It also covers national, religious, economic, social, cultural and development-related events and activities as well as Arab and regional affairs, and it has a network of correspondents abroad. Its discussion programs and coverage of important local and international issues also include analyses by expert commentators. In 2012, Oman TV produced a number of documentary films including-among other: Al Sifialh(The Abalone), Hayaat al Bedu(Bedoun life), Kunuz Oman al Bahriyyah (Oman's Sea Treasures) and Ibn Battuta.
Oman General TV's output, which ranges from chat shows and live interviews to programs on development and cultural, economic and other topics, includes: Istratigiat, Oman today and Qahwat al Sabah(Morning coffee).

In 2014 BFE was awarded to build two OB vans for OMAN TV by their partner United Broadcast & Media Solutions who were the prime contractors of the project. The OB vans are used for live coverage of sports events, drama programs productions and coverage of local and international events.

One of the major challenges was to take the environmental conditions of the Sultanate of Oman into consideration with regards to temperature, humidity, and dust. The two vans were required to have a cooling solution according to the extreme climatic conditions such as up to 50°C during the summer.

The first OB van HD1 Salalah, equipped with 8 cameras is a compact car OB van on a Mercedes Actros 2532 chassis and a total length of 10,70m. This vehicle will be used at Salalah, the second largest city in Oman in the south of the Sultanate.

The second van HD2 Muscat is a trailer version 10 camera OB van with extension and a total length of 12,60m and will be stationed in the customer's headquarters in Muscat, the capital of Sultanate of Oman.

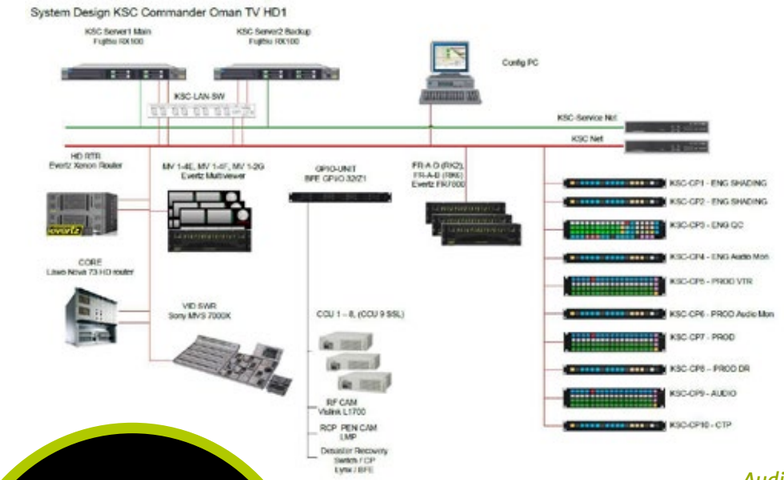
Both vans are divided in audio control, video control and technical control rooms. The audio spaces of both vehicles are equipped with a Lawo MC56 Mixers which are configured in accordance with the existing consoles that are already used at Oman TV. A support van on a Mercedes Actros 1222 chassis belongs to each unit. The project has been realized in cooperation with Carrosserie Akkermans based in the Netherlands.

HD2 Production Area

Tender Truck

HD2 Vision Control

Inside HD2 Muscat



HD2 Central Termination Panel

TECHNICAL SYNOPSIS

HD1 Salalah

OB Van

Video

- 8x Sony HDC-2500 cameras
- 1x Sony HDC-3300 SloMo cameras
- 2x LMP Cerberus Goal cameras
- Wireless Camera Adaptor Vislink L1500
- Lenses from Canon
- Vision Mixer Sony MVS-7000X
- Monitor Wall with Sony PVM-A250 and Evertz Multiviewer VIPX-8x2
- 2x Sony XDS-PD2000
- 1x Abekas Mira 8ch
- Character Generator from Vizrt: Viz Trio HD
- Digital Glue: Evertz 7800 Series
- System Controller: BFE KSC
- Video Matrix: Evertz XE8 96 x 96

Audio

- Audio Mixer: Lawo mc²56 with 32 Faders
- Audio Matrix: Lawo Core with Dallis Frames 328 x 328
- Monitoring: Genelec 8030
- Microphones: Shure

Intercom

- Matrix: RTS ADAM 48 x 48
- Wireless Talk-Back: Clearcom Pro 850 and Motorola
- ISDN Codec: Aeta ScoopFone

Coach Built

- Length: 10,0m
- Height: 4,0m
- Width: 2,5m

TECHNICAL SYNOPSIS

HD2 Muskat

OB Van

Video

- 10x Sony HDC-2500 cameras
- 1x Sony HDC-3300 SloMo cameras
- 2x LMP Cerberus Goal cameras
- Wireless Camera Adaptor Vislink L1500
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Intercom

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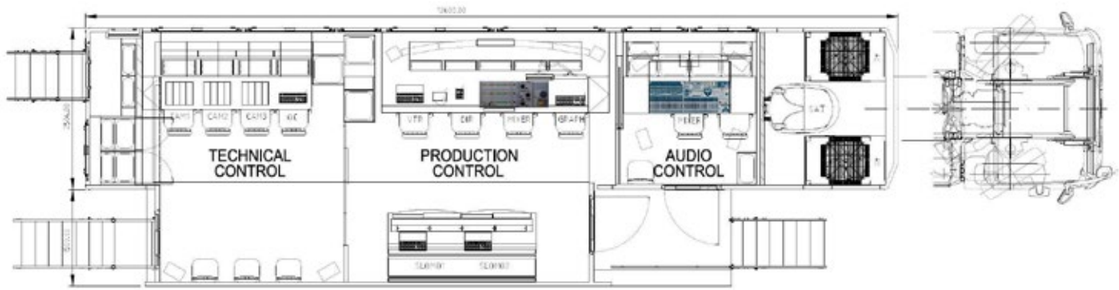
- Wireless Talk-Back: Clearcom Pro 850 and Motorola
- ISDN Codec: Aeta ScoopFone

Coach Built

- Length: 12,6m
- Height: 4,0m
- Width (stowed): 2,5m
- Width (expanded): 4,0m



BFE was also awarded a contract to build a flight case studio for OMAN TV by their partner United Broadcast & Media Solutions as well. The entire central technique is integrated in six shock absorbing 19" flight case racks. Part of this production unit is a support van on a Mercedes Actros 1522 chassis. The support van has been designed for the transport of the flight cases and any other production equipment necessary. Furthermore, the KSC Commander control system developed by BFE and the KSC control panels were implemented in the two OB vans as well as in the flight case studio. The duration of the overall project took 15 months and it was finalized in February 2015.

United Broadcast UBMS

About United Broadcast & Media Solutions

Founded in 1997, United Broadcast & Media Solutions (UBMS) is a UAE-based company offering a variety of cutting edge professional products and services in the broadcast field. UBMS stocks and distributes the largest volume of products for professionals within the Audio/Video, Media and Broadcasting Industry, as well as turnkey solutions from complete system design to installation and consultation.
UBMS is the leading distributor of Broadcast, Professional Video Camera & equipment in the Middle East & Africa and currently represents over 80 international brands such as Sony, Arri, Sachtler, Vision Research, Ianiro, Libec, Blackmagic Design, Autocue, TVU Networks, Zeiss, Nila, and many more. Through such careful brand selection they are able to offer their clients the best available solutions and also provide professional (Light-Camera-Action) support to maximize the quality of their experience, performance, and productivity.

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BFE STUDIO UND MEDIEN SYSTEME GMBH

About BFE

BFE Studio und Medien Systeme GmbH is a manufacturer-independent broadcast systems integrator with more than 40 years of experience in the planning and implementation of complex projects in broadcast and media technology. As a competent and reliable partner, it supports customers in Europe, Asia, North Africa and the Middle East, implementing system solutions tailored to their specific requirements. As manufacturer of its own KSC product line, BFE also markets control and management solutions for the professional television and radio industry. BFE's branch office in Dubai Studio City supports activities in the GCC region. For more information, please visit www.bfe.tv

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IKEGAMI'S ROLE IN THE DEVELOPMENT OF 4K AND 8K CAMERA TECHNOLOGY

Ikegami Looks Beyond HD

Ikegami Tsushinki Co., Ltd. has a long a successful history as a pioneer in the development of camera systems. These include the world's first hand-held camera, first HDTV camera, first tapeless camera, first 3D camera and first 8K camera.

Looking back at the history of HDTV development, the first HDTV camera was developed by Ikegami more than 30 years ago, 1983, in collaboration with NHK. The camera head was large and required bulky multicore cables connecting with two breast-height rack units which housed the control unit electronics. Performance parameters such as sensitivity were very poor in comparison with current specifications. 20 years later, HD/SD simultaneous cameras based on HDTV became the mainstream for television studio production. During that period, technology progressed from tube to CCD, analog to digital, and the employment of ASICs in custom digital processors. 2001, the dawn of the 21st century, was the very year when Ikegami started to develop the first 8K camera. Like the first HDTV camera, this too was a joint project with NHK. The first unit was very heavy, weighing around 80 kg. Given that HDTV took about 20 years to progress from initial development into practical use, it is reasonable to assume that 2020, when the Tokyo Olympics are to be held, will be the actual target for the establishment of 8K technology. In Ikegami's experience, technical innovation has been achieved quickly once the essential parameters are determined. For example, the development of the detail sharpening function was achieved in 1985 using equipment in a 1U high rack. Within five years, the entire detail sharpening process could be performed in a single ASIC with an area of just 2 x 2 cm. 8K camera weight was gradually reduced from 80 to 40 kg, later 20 kg, and now less than 10 kg.

Based on this background, Ikegami has a consistent policy for the development of its next generation camera system, advancing quite literally 'Beyond HD'.

NHK Japan Broadcasting Corporation

Ikegami

TOKYO 2020

JAPAN WILL BROADCAST 8K BY 2020 OLYMPICS

NAB15-P1040191

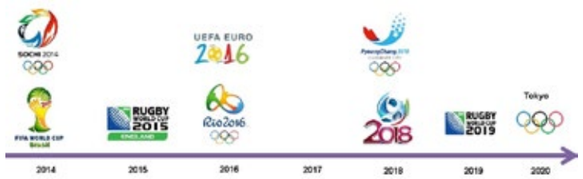
The technical target: 8K

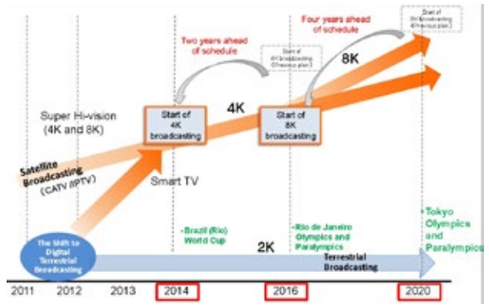
Ikegami's technical target is 8K development for 2020. The know-how and technology being acquired during 8K development are already delivering positive results for 4K and even 2K system development as well. For example, ASICs developed for processing 8K video can be scaled for 2K/4K with plenty of reserve in terms of heat output and power consumption. Once a transmission system is established for 8K, it will allow the large-scale trunk data delivery and it can also handle high speed processing and wide video dynamic range. Thus, the development of high level technology for 8K will bring contribute strongly to 4K and 2K system development both in terms of lower power consumption and the introduction of additional features.

At NAB2015, Ikegami simultaneously announced a new 8K and and a new 4K camera. The 8K camera can produce high quality pictures both at its native resolution and downsampled to 4K. For 4K, we announced a high-end 3-chip camera which can be used across 2K, 4K and 8K. The SHK-810 is our fourth generation 8K camera system. Fully operational, it weighs just one tenth of the 1st generation model.

The MIC technology roadmap

According to the technology roadmap issued by the Japan Ministry of Internal Affairs & Communications (MIC), test-broadcasts of 4K/8K by BS satellite television will start in time for the Rio 2016 Olympic and Paralympic Games. 8K on-air broadcasts will start as soon as possible (by 2018) in Japan. Also, according to the tentative report published on September 9, 2014 by MIC, 4K/8K broadcasting is targeted to coincide with the





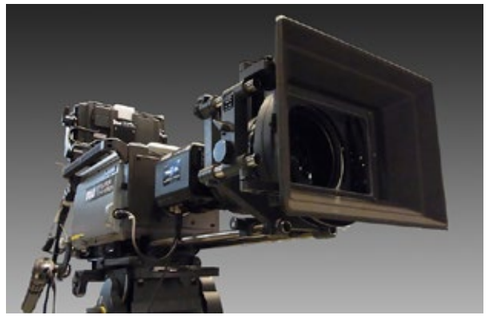
Tokyo 2020 Olympic and Paralympic Games. Per MIC, by the year 2020, 4K/8K broadcasting should be accessible at public viewing points in Japan. 4K/8K television sets should be widespread in the consumer market by that time. Expectations for the 8K UHDTV video are increasing strongly.

Anticipating a global increase in demand for 8K content, Ikegami exhibited at NAB 2015 in Las Vegas the SHK-810 8K UHDTV camera and a newly developed prototype 4K 3-CMOS camera with Ikegami's traditional operability and usability features. Ikegami will make further progress with 8K UHDTV technology as a leading supplier of professional broadcasting products.

Ikegami SHK-810 8K UHDTV camera

The SHK-810 camera employs a single 33 million-pixel Super 35 CMOS sensor, achieving 4,000 TVL horizontal and vertical resolution. The color filter on the sensor is matched with the dual-green SHV color arrangement, and achieves a high level of modulation depth. The System Expander enables the use of large viewfinders and full studio lenses, converting the portable camera into a full facility studio/field camera.

A viewfinder detail (VF DTL) function allows the camera operator to increase the detail edges to the viewfinder and picture monitor video for easy focusing. The lens aberration correction function and communication features (tally, intercom, etc.) are also available for conventional HDTV camera operation. The camera has a PL-Lens mount which allows the operator to use 8K lenses, cine lenses, 4K lenses and custom-designed zoom lenses for single-chip SHV cameras. A flange back adjustment system is built-in, enabling back focus adjustment of PL-mount lenses without shims. Standard SMPTE fiber cable can be used between camera head and camera control unit (CCU), allowing long-distance transmission for live broadcasting.



Superhivision camera

SHV-8000 Camera

Ikegami 4K camera

The new 4K camera can be used as an ultra-high-quality 2K and 4K camera for current 2K and next-generation 4K operation. Needless to say, it is designed to be compatible with 8K when that era arrives. As mentioned, this camera employs the technology developed for 8K such as a newly developed ASIC and 40 Gbps large capacity 40-gigabit/s output. The 4K camera has a three full 4K (8 megapixel) images. Transmission between camera and CCU is at 40 gigabit/s RGB, full dynamic range, 4:4:4. The newly developed sensors deliver a depth of field suitable for sports coverage and almost studio applications. The camera can accommodate a current 2/3 inch HD lens. The are several ways to make a 2/3 inch 4K camera possible. For example, 4K can be available using spatial offset with three or four 2K sensors. In this case, however, it is hard to acquire the real 4K resolution because of the influence of lens aperture ratio and lens aberration. The Ikegami 4K camera employs a prism system which provides faithful colour reproduction. For the 40 gigabit/s output path, SMPTE broadcast standard optical fiber can be used. 40 gigabit/s allows a 16 bit dynamic range signal using RGB 4:4:4 sampling or 12 gigabit/s at 4K60P 4:2:2). Also, multiple HD signal channels can be transmitted through bi-directional video trunk lines. The output interface incorporates spare slots to allow flexible expansion. The CCU will have four 3G SDI outputs (compatible with the 12G SDI de facto standard) plus a SMPTE 2022 IP output. Baseband may be better for the interface at studio. IP will be suitable for the long distance interface such as remote production.

Ikegami ASIC video processor

The video processor is a crucial device. We employ a fifth generation ASIC that is our compilation of technology development over 25 years. It will have various functions such as 3D color correction, chromatic aberration correction, 4K/2K independent detail enhancement, dynamic range and flexible gamma. The ASIC is flexible and will embrace all three generations: a single ASIC for 2K, dual ASICs for 4K for 4K, four ASICs for 8K and eight ASICs for Full 8K.

Summary

Based on a life-cycle of approzimately 10 to 15 years for broadcast equipment, a 4K camera system should be at least three-imager Full 4K. This camera will also be usable not just in the 4K era but when the 8K era, using very high quality upconversion. Ikegami will be ready for 8K with the additional 4K-compatible flexibility made possible by high grade downconversion. We believe this is best solution for our customers as it gives the the freedom to operate in three generations of television content production, 2K, 4K and 8K, with uncompromised high quality.

AJA CION AND CONVERTERS STREAMLINES 4K PRODUCTION AND POST FOR WASKUL.TV AT NAB 2015

Delivering on its promise to create inspiring, educational content, Waskul.TV produces and distributes a wide range of interviews with luminaries in the technology, media and entertainment markets. At trade shows like the 2015 National Association of Broadcasters (NAB) Show, Game Developers Conference (GDC) and others, Waskul Entertainment brings its state-of-the-arte StudioXperienceTM venue which acts both as a technology showcase and a live broadcast studio that features technologies in a real-world production environment. Prior to a live event, its crew sets up the StudioXperience which is often the main base of operations for industry leading brands at the event. With spaces as large as 6,000 sq. ft. hosting dozens of technical demos from industry leaders in addition to a live broadcast studio, this is a significant effort requiring as much as 60,000lbs of equipment. Inside the Broadcast Studio during live events Waskul Entertainment CEO Steve Waskul hosts a series of long format interviews with industry luminaries which are streamed live during an event and featured post show on-demand at Waskul.TV. Looking to turn its video quality up a notch this year, Waskul.TV added five AJA CION cameras into its workflow ahead of NAB 2015 in Las Vegas to facilitate desired 4K production workflows.

"We wanted to bring viewers a nice, clean, filmic picture, and knew CION would allow us to achieve that with higher raster 4K," said Steve Waskul. "At the same time, the CIONs also offered up the ability to record 4K ProRes, which turned out to be a huge benefit for post. With all the simultaneous live outputs on the CIONs, our footage was ready for both edit and live delivery right out of the camera; it was incredibly fast and simple."

This year at the 2015 NAB Show, the StudioXperience Broadcast Studio featured a 600 sq. ft. lighted stage, an audience theatre area with VIP motorized leather seating, a large control console / production area chock-full of creative tools and a mission to show a complete production workflow from content acquisition through final delivery to a global audience. To deliver on this, Waskul.TV created a robust 4K live production workflow, integrating the CIONs with a host of other equipment, including two AJA KUMO routers, several AJA ROIs, Hi5-4K and HA5 Mini-Converters.

Ganging the CIONs together via an Ethernet switch and the built-in Ethernet ports on each camera, the crew assembled a multicam setup to control the cameras remotely from a laptop at the console using CION's web-browser UI. "The CIONs were simple to setup and configure, and the camera's web-browser UI was ideal for live production" Mr. Waskul shared. "It allowed our team to easily rename clips, adapt settings and apply our changes to all five cameras on the fly in a matter of seconds. There was no hitting the record button five times; you just pushed one button on the laptop and it triggered all of the cameras."

All five CIONs fed directly into two KUMO routers set up for 4K routing. One KUMO distributed a 4K feed around the facility and sent a 1080p feed to a NewTek TriCaster 8000 switcher for the live stream. The second KUMO carried a redundant 1080p signal to the streaming team and partners and pushed a 4K feed to the makeup artist, which allowed her to perfect the host and guest makeup by seeing them in true 4K. Serving a dual-purpose, AJA ROIs were used to convert feeds from guest laptops for piping into the stream. Waskul.TV also tapped AJA Hi5-4Ks and HA5s to feed monitors.

With CIONs at the heart of its production pro-duction pipeline, Waskul.TV found 4K acquisition seamless. Using the cameras, they were able to maintain a consistent high-quality picture for the live stream and also streamline post-production and delivery for the on-demand programming. Having captured ISO records from the CIONs to three AJA Pak media drives assigned to each camera, the production team was easily able to offload the footage via five AJA Pak Docks to edit workstations on site, while still recording switched 1080 from the TriCaster. Waskul concluded, "We were impressed by the CIONs; they not only offer up a beautiful image and tremendous workflow flexibility, but also simplified how we ran our live production and post environment. The cameras also never missed a beat, remaining reliable throughout multiple days of live production and streaming."

About CION

Ergonomic and lightweight in design with unparalleled connectivity, the CION production camera is capable of shooting at 4K/UltraHD and 2K/HD resolutions. In-camera recording directly to the Apple ProRes family of codecs, including 12-bit ProRes 444, enables incredible image quality capture to cost-effective AJA Pak SSD media at up to 4K/60p, and offers compatibility with a wide range of post production applications. CION can also output AJA Raw at up to 4K 120 fps via 4x 3G-SDI or up to 4K 30 fps via Thunderbolt™.

About AJA Video Systems, Inc.

Since 1993, AJA Video has been a leading manufacturer of video interface technologies, converters, digital video recording solutions and professional cameras, bringing high-quality, cost-effective products to the professional, broadcast and post-production markets. AJA products are designed and manufactured at our facilities in Grass Valley, California, and sold through an extensive sales channel of resellers and systems integrators around the world. For further information, please see our website at www.aja.com.

waskul.tv AJA VIDEO SYSTEMS CION STUDIOXPERIENCE™

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An EMG Company

CTV OUTSIDE BROADCASTS

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OB Vans

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THE OPEN 144TH ST ANDREWS

CTV at the Open

Technical Director Hamish Greig has worked with CTV on golf tournaments since their first Open in 1988, and worked on the company's first European Tour live golf coverage in 1991. Here he talks us through the 144th Open coverage at St Andrews, and some of the broadcast difficulties which are specific to golf.

Golf coverage for television is all about space and movement – it is unchoreographed, unrestricted and unpredictable. Planning the infrastructure for golf coverage is unlike planning for any other sport in that it's all about understanding the topography of the course. The two biggest challenges in golf are geography and range. It's not unusual for the broadcast compound to be kilometres from the golf course, but fundamentally it's the physicality of the course that causes the most headaches because the infrastructure has to be able to give full course coverage, all the time.
At the Ryder Cup for example, every shot needs to be covered and recorded, and this is achieved with a multitude of mics, cameras and mobile reporters who need to be where the story is. Providing this mobility is central – at the same time as someone is teeing off on one hole, someone is being interviewed on another, or putting for a birdie on another. This all needs to be captured for live coverage over multiple platforms, as well as for ISO.

CTV are specialists when it comes to golf and we have become one of the largest and well-respected independent OB Companies in Europe. In the early 80s it wasn't uncommon for coverage consisting of the last four holes. These days, things are very different!

We've covered all 18 holes on all manner of major golf tournaments for the last 25 years, and CTV are the go-to experts in this very specific area of sports. At the 144th Open, CTV manages the entire infrastructure for all the broadcasters covering the tournament, and directly for the BBC, ESPN, TGC, TV Asahi and The Open Live for R&A . Having control of the whole frequency plan makes it much easier as we can coordinate the frequencies for everyone, and with an all-Calrec fleet the audio is also locked down over Calrec's Hydra2, which makes management of the I/O very easy.
At the Open we cable mic for stereo tees and the greens on all the holes, and use RF packs on the fairways so cameras can move around. RF is such a big issue that CTV developed its own bespoke products, creating an RF web across the course. At St Andrews we will use 130 x TED devices, which are own brand of SHEDs (SMPTE Hybrid Elimination Device) – these enable us to use ordinary single-mode optical fibre for all our camera channels located throughout the course.

Photo © David Fisher/REX

Links courses are easier to manage due to – you guessed it – their topography, but some courses might have fairways that are tree-lined on one side and a bank on the other. For example, the whole course at Wentworth Golf Club is tree-lined. You go out about 4.5 km and back again, and in between you can cross six interior roads, mansions, hills, different contours....you're basically crossing a suburb! This kind of set up has very unique RF, talkback, radio mic and effects mic issues, and is very different to setting up at a course like the Emirates Golf Club in Dubai where everything spirals out from the centre of the course. Reporters can be anywhere at any time and RF receivers need line of sight. Factor in hills, trees, cliffs and a few thousand people, and it's easy to see how terrain plays a big part. To minimise some of the issues common with such environments, our RF over fibre system for radio talkback and radio mics is also bespoke and was designed by CTV's Head of Sound Ian Smith. Historically we would use different sets of radio mic receivers, talkback transmitters and base stations which we would plug on multicore and fibre – say, one set of transmitters on the course and 2/3 sets of receivers across the course to bring the audio back to base. Likewise with Talkback there would be 2/3 sets of radio transmitters around the course.

Photo © David Fisher/REX

Photo © Kieran Galvin/REX

Photo © Brian Rasic/REX

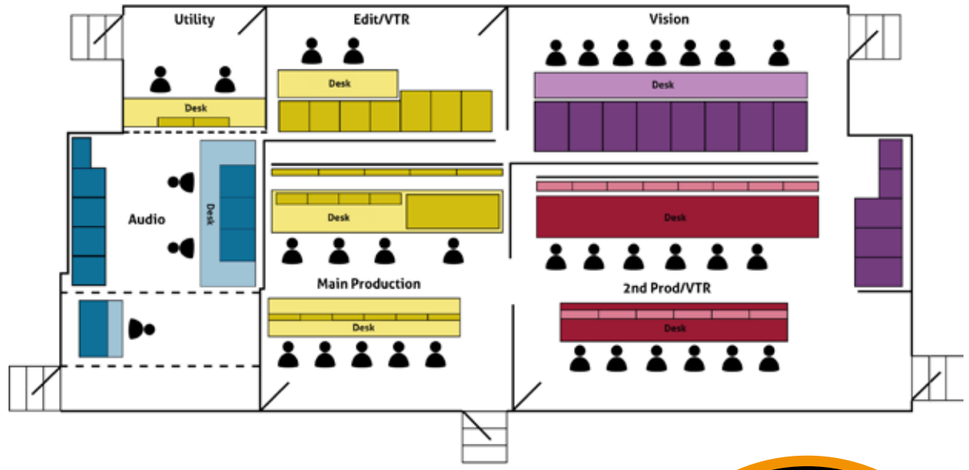
Production Area 1

Vision Control

Production/VTR

Sound Area

Edit/VT



TECHNICAL SYNOPSIS

OB11

OB Van

Video

28 Cameras inc Sony HDC-1500/2500, Sony HDC-4300 and Sony PMW-F55
Lenses from Canon and Fujinon (all focal lengths available)

Production Area 1
Vision Mixer: Sony MVS-8000X HD/3G/4K 8ME, 4DME
Monitor Wall: Vutrix LED with UMD

Production Area 2
Vision Mixer: Sony MVS-8000X satellite ME
Monitor Wall: 10x Vutrix LED with UMD

10x EVS LSM XT3 8ch servers (capacity =96ch)
Monitors SloMo: Vutrix with UMD
Digital Glue from Axon
Video Matrix: Imagine Communications IP3 576 x 1024
Control System: Axon Cerebrum
Video Measurement: TEK WVR8300 & Leader LV7770

Sound

Audio Mixer: Calrec Apollo Bluefin 64 Faders
Audio Router: Calrec
Monitor Wall: Vutrix LED with UMD

Intercom

Matrix: Telex ADAM 128 x 128
Wireless Talkback Equipment: Motorola GM360, GP340

Coach Build

Length: 16,6m
Width stowed: 2,5m
Width expanded: 6,6m
Height: 4,1m

This meant the production crew and camera operators would have to keep switching channels to maintain coverage. For the audio this is often unacceptable as the audio would drop out and sometimes that switching of the audio would filter through on-air.

Ian's solution was to customise the kits to combine a number of RF mic receive sites to provide full course coverage. Similarly for talkback, the channels are first combined together, then split so that they can be distributed to multiple sites for retransmission. It gives us mobile phone style coverage to plug the gaps - if we have poor coverage we can add transmitters and receivers into that geographical location. In simple terms it means we can have one set of radio base stations on one frequency which work anywhere on the course. At the Open there are typically 43 x duplex base stations for Talkback across all the broadcasters, and another 11 x base stations purely for IFB. Our technique means there is no switching in the audio pathway as it's combined all the time.

This works for us, although a lot of work still goes into testing – we can do a recce in advance to check the RF frequencies, but you can never get a true representation because you can't take a crane to a recce! At the event the transmitter height gives you the coverage, but it also introduces a lot of other noise. And RF over fibre is also susceptible to distortion if the fibre is not spliced properly which can introduce interference to the receivers, and the noise floor goes up as more are introduced. It's vital to test as we go along, and we use a lot of filtering, attenuation and gain to ensure the clarity of the signal.Courses like St Andrews have permanent underground fibre networks which help with much of the setup, making our job of cabling much easier, although there is still plenty of surface cabling that needs to be laid amidst the puddles and mud! St Andrews has 25 nodes where we can plug our SHEDs and I/O - we use 30 of Calrec's Hydra2 I/O boxes at the Open mostly on the course, connected by fibre. Again, the Hydra2 keeps the management of these boxes simple and intuitive.

The nodes also distribute power, and we have portable generators also around the course – these feed the SHEDs and also the Hydra I/O. Power is distributed centrally although we are now looking at solar and more environmentally-friendly options. Calrec's new Fieldbox and H2Hubs are interesting developments in that they give us another way to work with these infrastructures, where we will be able to build ad hoc networks very quickly and cheaply, and also localise power at the source.

Back at the Open, we are providing the infrastructure for 3 x XMO cameras, 100 x standard cams, 2 x 6 speed 4300's, 12 x ESPN emerging technology cameras, 5 x ACS SMARThead, Inertia Unlimited's "Turf Cams" which are the size of a £2 coin and located at the tee, plus 23 x radio cameras systems across different clients provided by AVS, Broadcast RF and CTV and additional POV cameras. We supply 23 x High Powered RF effects mics across the course, 27 x low powered radio mics, and a host of stereo hardwired mics on the greens and tees. At the compound the signals are mixed down by an all-Calrec fleet of consoles, where international broadcasters take all their feeds via MADI from our Technical Operations Centre (TOC). The BBC, ESPN, ITV, TV Asahi, the Golf Channel and the Open Live for The R&A all take feeds from the TOC. From the TOC, CTV use two hired Telegenic trucks for the BBC, both with Calrec Apollos for BBC domestic and ISO coverage, together with our OB10 and MVT3 for Host coverage.

ESPN's coverage is even more extensive. CTV's OB9 (with a 72f Calrec Alpha) does ESPN's Interactive TV featured group coverage and the ISO effects coverage. We have a 72f Artemis in a cabin to mix the main show, and another Artemis in OB1 to cover the ESPN SportsCenter show , and CTV's OB14 with a Calrec Omega does the R&A featured hole coverage . In total ESPN produce a SportsCenter show, a main sports show, interactive TV feeds, featured hole coverage and featured group coverage, and outside of the ESPN there are more discreet productions going on – in fact, in total there are13 discreet productions utilising 16 separate production vehicles plus a host of technical and cable support vehicles. The scale of ESPN's involvement is enormous: they have 5 x production vehicles, and a total of 43 cabins in the compound, plus a practice range studio, 2 x main studios and 4 x announcer booths. The ESPN Production Gallery is three tiers high. They have a dedicated EVS highlights unit and another space for ISO Operation – everything is recorded and turned around on site in addition to live coverage. Add in 4 x edit suites, a QC area, graphics facilities, office complexes, RF complexes and emerging technologies such as remote tracing and ball trajectory graphics and you essentially have a complete ecosystem! For these broadcasters, there are six Calrec's in total, which is handy from a signal management perspective as the audio can be managed via Hydra2 – the control and management of an audio network system like Hydra is a huge benefit.

At CTV we love covering the golf, and it gets bigger every year. The Open is like Groundhog Day – the minute it is finished we are assessing where we could have improved and we are planning for next year. Progressive broadcasters like ESPN love to push the limits of technology in their quest for more immersive coverage, and their investment in the audio is significant. We work very closely with them to help them to achieve their vision, and that's great for us – they want to be the best, they want to be leading edge, and that's where we also want to be.

TERADEK

TERADEK BOLT GETS GUNNY WITH OUTDOOR CHANNEL

BY DIRECTOR/DP JODY ELDRED

I come from a news and docs background, about 25 years in network news as a freelance DP/cameraman and sometimes-producer for ABC, CBS, NBC, CNN, the BBC, and a handful of other international clients. As a freelancer you learn pretty quick that the most efficient and most creative shooters get the most callbacks for work. Those who work slowly—though perhaps creating beautiful images— don't usually get as many calls as the guy who can do the same thing in less time. Sounds logical. The faster you work, the more you can create for your client. Whether its TV news, episodic TV, feature films, commercials or music videos (all of which I have worked in extensively), the more setups you can do in a day, the more pages of a script you can shoot, the happier the client will be. You're giving them better bang for the buck.

I am also a believer that SPEED = CREATIVITY. The faster I work, the more time I have to be creative... to do more complicated setups, to get more coverage than the next guy. If I can light a scene in 20 minutes that takes the next guy 30, over the course of a day I can probably have an hour more of setups done before we lose light.

This reality directly affects the equipment I choose to use in my work. Lights and grip that are faster to set up and tear down. Maybe using zoom lenses instead of primes to speed up changing the size of the shot. Whether I really need to slate shots, whether I really need dual-record audio. And video monitoring. The producers of Outdoor Channel's new show, "Gunny Time! With R. Lee Ermey" had a challenge on their hands. They wanted to up the production value by shooting 4K (which meant more complex camera systems and much more serious data wrangling), and getting a LOT of material in the can every day due to budgetary confines. Bottom line: they were going to need to work fast.

We met, and I helped devise a plan whereby we'd shoot two separate units, as simultaneously as possible. One unit would do "beauty shots" and the Phantom Flex 4K super slo-mo of the weapon being fired (amazing stuff), and the other would shoot "Gunny" doing his on-camera pieces with a weapons expert. There would be some overlap, but efficiency was key.

I would direct and DP the Gunny-and the-expert segments. Gunny (the legendary drill instructor from "Full Metal Jacket") is a seasoned pro and likes to "get 'er done", and I do too, so I knew we'd work well together. And we did. On a few occasions in the past I've used wireless video links, usually when the camera was too far from the monitors to practically run a cable. Those systems were iffy, big, very expensive, and frankly I was always a bit concerned about radiation as that transmitter was inches from my body. (I have a colleague who worked on reality shows for many years and they used older video transmitters. She recently died of cancer that she and many others believed was caused by this. I do not know, but I want to be smart about it.)

Filmmaker Jody Eldred

On "Gunny Time", we would be doing a LOT of setups every day, and would be shooting multiple cameras in rugged locations like desert, military bases, and steep hills. The producers would want to see what the cameras were shooting (as would I), but running cables across rough terrain and wrangling them all throughout the day with weapons, ammo, all kinds of gear and crew, would be a huge, time-sucking pain in the neck that we did not need. So I decided to go the wireless video route. Turn on the camera with its transmitter, turn on the monitor with its receiver, and SHOOT!

I discovered Teradek and their wireless video technology a few years ago and was immediately intrigued. My first questions had to do with RF or EMF radiation issues. I learned that they utilize safe wireless protocols, completely different from the RF and microwave systems I was familiar with. That was comforting.

Second, I found that the Teradek systems were very small and lightweight. Very easy to mount to any camera, regardless of size (OK, maybe a GoPro is stretching it...) As we we'd be shooting hand-held, that was a big consideration.
Third, I discovered that depending on the system, there was zero latency. No lag between what was happening on camera and what we'd be seeing on the monitor. And it was full HD: 1920x1080. (I had no need to monitor in 4K.) Fourth, I discovered that the Teradek systems are very cost-effective, and some were actually really inexpensive. THAT was refreshing! For these reasons, I chose the Teradek Bolt Pro 300 and 600 HD-SDI systems. We'd be shooting with Sony F55s equipped with Fujinon Cabrios, and the style was hand-held, working fast, lots of movement with Gunny, his weapons expert, and the soon-to-be-fired weapon (ranging from 3,000 rounds-a-second mini-guns to Civil War-era canons.) I needed to ensure high production value by monitoring the work our excellent cameramen were doing, making sure that when I yelled, "Cut! Next deal...", we indeed had a great take and were ready to move on. The Bolts quickly became an essential element in our day-to-day production.

The small transmitters were powered from the D-taps on the F55's Anton/Bauer battery mounts, and the receivers were mounted to HD monitors, sometimes battery powered, sometimes AC powered. There were no BNCs to run from cameras to monitors, no worry of cables getting in the way, no restrictions on where or how my cameramen could move. They were completely cable-free. And with the Bolt 600, they could be a couple of football fields away (IE way downrange) and we'd still get rock-solid images from them. 1080p60, 4:2:2, zero latency, working safely in the 5 GHz band.

Though I did not need it on this particular shoot, Teradek now offers the ability to natively use custom LUTs on the Bolt. This is a fantastic upgrade that would have enabled us to shoot in S-Log or Raw and wirelessly monitor the cameras' outputs with a Rec 709 LUT, or a custom LUT.

If you're unfamiliar with shooting Log or Raw and using a LUT, it's a bit like the difference between a still image shot JPEG vs. shot Raw. A Raw image looks washed out and very low contrast, but it gives you the ability to do significant correction. A JPEG image usually looks pretty good as-is... its look is "burned in" (kind of like shooting video in Rec 709) but you can't correct it nearly so much. Applying a Rec 709 LUT to a Log or Raw image is like applying a JPEG look to a Raw photo to see how it might look when you've color corrected it. Shooting Log or Raw also gives you several more stops of dynamic range than Rec 709, so it is a very useful tool for professionals. And now Teradek supports Rec 709 and custom LUTs wirelessly. Without it, a Log or Raw image would look washed out (and usually causes alarm for a producer or client, uneducated in the use of Log and Raw...)

We're really spoiled now. The production company loves the Bolts. They are lightweight, very durable, easy and fast to set up, and make setting up and moving "video village" fast and easy. Having cameramen who are free to roam, move, get shots-- with no cable or cable wrangler-- is a terrific way to go. Since I'm all about speed, maximizing my creativity, and getting the most bang for the buck for my clients, the Teradek Bolts are now my go-to video transmitters and will travel with me on every shoot. No more cables, thank you very much!

Producer, director, DP, writer, and published author Jody Eldred is a 39-year veteran of TV/Film. He's worked 31 years in Hollywood on many of the highest-rated network dramas, feature films, docs, and network news programs. Among his 20+ awards is a DGA nomination for Best Documentary Director, and a national Emmy working at ABC News covering the Iraq War. He is the founding member of Sony Electronics' elite ICE Team.

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mbc

MBC MIDDLE EAST BROADCASTING CENTER

LIVE PORTRAIT

Television Radio Network

General Contact

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The Middle East Broadcasting Center (MBC) is an independent entertainment pan-Arab television and radio network targeting the Middle East and North Africa audiences. Launched in 1991, MBC holds the distinction of being the first private free-to-air satellite broadcasting company in the Arab World. MBC currently has 17 television channels, with programming that includes 24-hour news, 24-hour movies and 24-hour music, as well as entertainment for Arab women, children's entertainment, and general family entertainment. MBC also offers two radio stations: MBC FM and Panorama FM.

In 2012, MBC recognized the need to upgrade its legacy audio consoles to a fully digital platform. "With the increasing complexity of our technical infrastructures and our dedication to providing the highest-quality television programming, we knew it was crucial to stay ahead of the technology curve," said Raed Bacho, Broadcast Manager of MBC. "Equally importantly, we knew that we would be upgrading multiple consoles over the span of a few years, so we wanted to install consoles that were technologically consistent with each other. Product continuity was a top priority, so we decided early on that settling on a single manufacturer would be the ideal solution."
Product support was also key in the purchasing decision. "Customer support was and still is a main factor in choosing a product, and this was certainly a key factor in our console selection," Bacho said.

العربية Al Arabiya

Al Arabiya

To help find the right solution for its particular needs, Bacho and MBC turned to regional distributor GSL Professional, which recommended Studer's Vista Series consoles. "Studer Vista consoles are synonymous with quality and reliability and that reputation is well-deserved," said Ibrahim Shishani, Broadcast Sales & Technical Executive, GSL Professional. "We saw an opportunity for MBC to standardize on the Vista platform as we believed they would benefit greatly from the performance, intuitive operation and connectivity of the Vista consoles."

"We have had a very long, solid relationship with Studer, having used their products since 2002 when our Dubai Media Center studios opened. The products have shown great stability along with the flexibility needed for workflow, and console architecture was also something that set Studer apart from the competition," Bacho noted. "We have also been working for a long time with GSL Professional and their technical team has provided exceptional service. Over the past several years, GSL has spared no efforts to support us." MBC's first step was the purchase of a 62-fader Studer Vista 9 digital console for its Al Arabiya news channel, based in Dubai Media City. Al Arabiya is a free-to-air channel, providing news, current affairs, business and financial markets, sports, talk shows and documentaries. "The Vista 9 at Al Arabiya proved to be tremendously successful, as it was easy to learn, delivered incredible audio quality and gave us the confidence to move forward with the Vista platform," said Basheer Saad, Sound Engineers Supervisor of MBC. A year later, in 2013, MBC upgraded its control rooms at MBC 1, a free-to-air, pan-Arab general television channel, also based in Dubai Media City. For this location, GSL Professional supplied two Studer Vista 9 consoles. One Vista 9 has 52 faders while the other features 62 faders.

With Vista 9 consoles now in three main control rooms at MBC in Dubai Media City, and with each control room serving long hours of news and other programming, MBC had the confidence in Studer to continue expanding with the Vista platform. So later in 2013, MBC upgraded the Dubai Media City-based control room of its MBC 3 studios, which exclusively provide children's programming. However, this time MBC opted for the compact—yet powerful—32-fader Studer Vista 1.

The Studer Vista 1 features the same quality and intuitive operation as all other Studer Vista consoles, in a compact and low-cost configuration. It comes complete as a single chassis, with control surface, I/O connections and DSP all integral, considerably reducing weight and footprint. The Vista 1 is based largely on the Vista 5, with all the functionality of the Vistonics™ user interface and Studer Vista control surface, plus features such as true broadcast monitoring, talkback, red light control, GPIO, N-x (Mix Minus) busses, snapshot automation and DAW control.

"Our familiarity with the Vista 9, not to mention our enjoyment in using the consoles, made the Vista 1 a great fit for our upgrade at MBC 3," Saad noted.

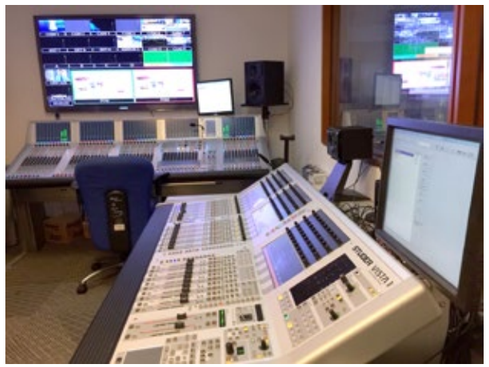
GSL PROFESSIONAL

STUDER by HARMAN

In 2014, MBC added a 32-fader Vista 1 console to its Dubai Media City studios for Al Hadath, a free-to-air news and current affairs satellite channel, which operates as an extension of Al Arabiya. In addition, MBC's news bureau in Cairo is also equipped with a 32-fader Vista 1. MBC's decision to standardize on Studer Vista consoles goes beyond the convenience of working on familiar surfaces from station to station. Just as importantly, the ability to share sources between consoles was a priority, as was redundancy. "We knew that we didn't only need to upgrade the quality of our consoles, we also had to make our workflow more efficient," Bacho said. "The integration needed to ensure flexibility and redundancy to support our programming around the clock, and we needed the inputs and output to be configured uniquely to the needs of each studio."Utilizing Studer D21m I/O systems, MBC has connected each of the consoles in its Dubai Media City studios via MADI—a worldwide standard electronic communications protocol—to share sources and provide redundancy.

Since the Vista 9 and Vista 1 consoles are built on the same platform switching between the studios is an effortless task. In addition, with an upgrade to Vista software version 4.9, MBC has benefited from the Studer VistaMix feature, which is an automated microphone mixing algorithm based on gain sharing for simplifying the mixing task at multi-contributor events. VistaMix removes the need for an operator to manually adjust all the faders all the time, leaving the microphones of talking participants open, while closing the microphones of silent participants in order to reduce spill and background noise. "VistaMix is a great tool to reduce the noise coming from the newsroom, which is an open area, in talk show programs with multiple presenters and guests on the air," Saad said.

MBC has also benefited from Studer's proprietary FaderGlow™ technology, which illuminates each fader in the color relating to the relevant function, creating an instant overview of console status. "FaderGlow is so handy when we work live in our 24-hour news station," Saad noted. "These types of features contribute to the ease of use of the Studer consoles and enabled our sound engineers to adapt quickly to the technology."
The Studer Vista consoles have provided a reliable and high-performance platform for MBC, enabling the engineers at the network to operate efficiently and effectively while sharing information in real time.



Looking towards the future, MBC recently secured the Saudi National Football broadcasting rights for the next 10 years and is busy planning for an expansion of its operations in the Kingdom of Saudi Arabia. "The Studer consoles have definitely met our needs so far, as evidenced by the fact that we have continued to upgrade our studios with Vista consoles," Bacho said. "We have had great experience with Studer in terms of audio quality, workflow and support.

"The GSL team is keen to give the support needed to any of its existing and potential clients, and we are very happy to have such a strong relationship with such a successful customer as MBC, and we will continue to support others to keep up and we would like to take a big part in other success stories in the future," Shishani concluded.

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JAVA JAZZ FESTIVAL STAYS ON AIR AND ONLINE WITH NEWTEK

TriCaster, 3Play and TalkShow combine help smooth running of annual music event

The annual Java Jazz Festival in Jakarta, Indonesia, is without question a headline event, drawing more than 120,000 attendees from all over the world to watch international and local artists perform on 17 stages during this three-day event. Those unable to attend can experience the sights and sounds through live broadcasts on local cable (First Media) and subscription television (BiG TV), as well as live streaming on YouTube, from four of the main stages. However, making sure every one of the performances is captured without a glitch is a tall order.

"Failure is not an option," says Djundi Karjadi, owner of equipment reseller PT Interindo Multi-Media and technical director of the music festival. It is his responsibility to ensure that the live broadcasts of the event and the recordings of the performances are flawless.

Hoping to improve the workflow year upon year, Karjadi added new equipment to the March 2015 festival line-up. In 2014, six TriCaster 8000s, two TriCaster 460s and one TriCaster 410 served as his main production hub. This year, he took a big step forward with three more 8000s, a 32-terabyte ProMAX Studio storage solution, and a 3Play 4800 replay system. Karjadi was able to run three pairs of TriCaster 8000s in redundant mode, covering the four main stages (two of the smaller main stages shared one pair since no more than three main stages are live at any given time). The new configuration provided a back-up system that could be deployed without any delay, should one be necessary.

The ProMAX storage enabled the crew to organize the large number of ISO clips that were generated from the different stages on different days. As a result, the on-site technical team under Karjadi's direction could record directly to the ProMAX NAS (network-attached storage) in a single, pre-organized volume, making it easier to manage later during remixing.

For the broadcast and live stream, the group used dedicated broadcast mixers and real-time mastering. Among the broadcast and recording equipment at the four main halls were an Avid Venue Profile System with 96-channel input and 16-channel output (at stage D2), an Allen & Heath iLive-T112 64-channel input/32-channel output system (at stage D1), dual Yamaha CL5 Systems (at stages A2 and A3), various Venue cards, Mac Pros running Avid Pro Tools, and other hardware. The mastering equipment, all located at the main stage facility, included a 48-channel input/24-channel output Venue Profile System, a number of Venue cards, and a Mac Pro running Pro Tools. In addition, the group used cameras from Sony (dual-format HDC-1700s and HXC-100s) and Panasonic (AK-HC3800G).

Several sets of AJA FiDO-2T SDI/optical fibre mini-converters and AJA FS2 dual-channel frame synchronizers and converters pulled all the video from the stages to the main control room and de-embedded the audio to feed the live mastering system. Two AJA Kumo 3232s were used for routing.

Working In Concert

Four of the TriCaster 8000s were located in the main broadcast room. The other two were at the D1 stage, where a fibre connection enabled them to record directly to the ProMAX storage via the network-attached storage server (NAS). Each camera ISO was recorded twice: once to the NAS and once to TriCaster's local storage. "For redundancy purposes, the other would take over and the show would go on," explains Karjadi.

One of the challenges after the event is organizing the clips from all the various hard drives during the three days of the event. "Adding ProMAX NAS to the workflow really simplified the whole process," says Karjadi. "Rather than transporting all the individual drives and copying the clips, all the ISO clips are now recorded directly onto the NAS, plus we have a backup copy on the TriCaster 8000 drives."

To avoid saturating the Gigabit Ethernet connection, they cross-recorded. For example, the D2 stage used a seven-camera production in addition to the program out (PGM); one TriCaster was used to record cameras 1-4 to the NAS, while cameras 5-7 and the PGM were recorded onto the local drives. Meanwhile, the second machine recorded cameras 1-4 to the local drives, and cameras 5-7 and the PGM to the NAS. "I was using only four streams on each TriCaster, so I could have six TriCasters recording all at the same time onto the NAS, and I didn't go over the 1Gbit limit of the Internet bandwidth," says Karjadi. "We had 24 HD streams recording at the same time, and the ProMAX was only at 15 percent utilization." According to Karjadi, when he set up the plan and calculated the bandwidth, it all seemed reasonable. "You can design, plan, and calculate bandwidth. But until you actually try it, there's always a worry," he says. "But I was extremely pleased with the result."

Play It Again

Another new addition to the pipeline was the 3Play system. Typically used for instant replay and slow motion in sports, it really proved its mettle at the musical festival. As Karjadi explains, sometimes an artist or band will finish their scheduled show late due to a delayed sound check or interaction with the audience during the show. This, in turn, creates scheduling issues as the next act begins on another stage. A few months ago the idea came to Karjadi to use the 3Play replay system. "If a stage is running long, we just broadcast until [the show] ends and cue up the next show on 3Play and start it when the other one is finished," Karjadi says. "I don't have to cut anything."

Backstage

As for the other equipment, one of the TriCaster 460s acted as a local master controller for output by the First Media/BiG TV Mix HD channel to a separate local TV station, which had permission to air any of the feeds from the four stages. (The station has its own graphics overlays and schedule that can be different from the YouTube live streams.) The other TriCaster 460 was situated in a small studio where interviews by one of the TV stations were conducted. The TriCaster 410, meanwhile, was used to program the promo LED displays spread throughout the venue that advertised various festival info such as schedules and commercials.

The team used the TriCasters to handle animated logos, store transitions, lower thirds using frame buffers, and GFX to insert Twitter comments into the video. They also used NewTek TalkShow for broadcast-quality live Skype interviews to acquire live audience reactions.

Java Jazz occurs once every 12 months, but the festival owner also hosts two other music festivals each year, all of a similar scope. After finding success with the new workflow at Java Jazz 2015, Karjadi plans to adopt these solutions for the next festival and will modify them as necessary. "We always run into things and have to find solutions year after year," he says. "We solved the scheduling issues with 3Play, and the recording challenge using redundant TriCasters. We always come up with something new."

While there may be alternative solutions available, they all carry a hefty price tag. "What we did is economical and does the job really well," says Karjadi of his new workflow. "I believe I get the same great result with this equipment that I would with kit that costs much more."

www.newtek.com

LIVE BROADCASTS BY RT1.TV

rt1.tv production GmbH, a subsidiary company to rt1.media group under the umbrella of Mediengruppe Pressedruck, provides broadcast services to a variety of national and international TV stations, production companies, large industrial companies, and media agencies. The company employs more than 70 professionals and operates 10 OB vans, all equipped with SNG-technology and four to eight HD cameras.

Bernd Pohlmann

Gunnar Wellen

Sporting events are one of the largest areas of business for rt1.tv, with recent projects including the Champions League final and Europe League final, and other areas of focus including political events such as the G7 Summit, press conferences, business events and others. Most recently, teams provided in-depth coverage of Wimbledon with two vans on-site and the Tour de France with one van. Companies operating OB vans face a number of challenges, from the limited space available for equipment and personnel to the need for flexible solutions that can meet the wide variety of production needs experienced in the mobile environment. Crews often don't know what the next assignment will be, so the vans must be ready for whatever event is next on the schedule. This fact alone makes it difficult to spec and build vans that will serve all the current demands and also be ready for opportunities that are on the horizon.

The OB vans in the rt1.tv fleet are equipped with the very latest in high-end broadcast technology, including HD cameras, non-linear mobile editing suites, and ENG crews. Each van is designed to provide full broadcast capabilities to enable high-quality content creation and rich storytelling opportunities. The vans are powered by leading-edge technology that makes it easy for operators and technicians to make the most of each assignment and deliver results that satisfy customers and keep the work coming. When it came time to outfit the newest van, rt1.tv turned to Wellen+Nöthen GmbH, one of the leading German retail and specialist firms in the broadcasting and media industry. Wellen+Nöthen carries broadcast solutions from a number of suppliers and works with clients to select the best options to fit their specific technical and business needs. Together, the companies assessed the production requirements, the space available in the van, and the best technology options on the market.

rt1.tv has been using solutions from Grass Valley, a Belden Brand, for more than 20 years because of the advanced technology and strong support. Most of the company's other vans already include Grass Valley equipment, so when it came time to choose the equipment for the new van, the team at rt1.tv specified more Grass Valley solutions.

"The requirements of rt1.tv are very specific, particularly around the demands of live sporting events," noted Gunnar Wellen of Wellen+Nöthen. "Grass Valley offers market-proven solutions that give our clients the peace of mind they need to plan for the future. Our relationships with our clients are very important to us, so we steer them toward the ideal solutions that address their needs. In this case, we were all in agreement about what supplier was the right choice."

"Our experience with Grass Valley over the years has been so positive that choosing the technology for the new van was an easy decision for us," agreed Bernd Pohlmann of rt1.tv. "Ultimately, we need to deliver first-class quality for our clients, and to do that, we will invest in the best equipment available. We look for quality, reliability, and scalability when we put together a new OB van, and that's exactly what we get with the Grass Valley product line. It's important to have a supplier that is always innovating and always thinking about how to make our business more successful."

rt1.tv

grass valley
A BELDEN BRAND

Wellen+Nöthen
Köln Berlin

The new van is packed with some of the latest technology from Grass Valley, including six LDX 80 Première Camera chains, an LDX 86 Hi Speed Super Slow Motion Camera system, an NVision NV8140 3G Routing System, a 3 M/E Karrera S-Series Production Switcher, and Kaleido Modular and Kaleido-X16-D Multiviewers. With this new equipment, the company expects to do much of the same kinds of work, but in a more efficient and comfortable environment that keeps the operators happy and opens doors for new project opportunities. When asked what the primary considerations were for the new van, rt1.tv noted that it is always looking for state-of-the-art technology that is a good fit for today but also future-oriented. In addition, the company notes that all of its OB vans must meet customer requirements but also be lightweight and agile enough to meet the demands of travel in and around Europe as projects arise. For that reason, it's important to have equipment with a compact footprint that can also be moved easily between vehicles as needed.

"The cradle concept of the Grass Valley cameras makes it very easy for us to move the cameras from van to van whenever we want," Pohlmann added. "We need to be able to use whatever camera is best suited to any particular event, and not be tied to the specific van that may be available. Being able to switch cameras without having to move a lot of wiring or ancillary equipment is a big advantage."

Another feature cited by rt1.tv in its purchasing decision is the e-License model from Grass Valley. The program makes it easy for customers to upgrade any camera within a series to the next model up, either for one-time use or permanently. This makes it easy to start with a lower investment and step up to the enhanced capabilities as the business demands it. For example, rt1.tv can buy an e-License that allows it to enhance the capabilities of one of its LDX 80 Première cameras, giving it the functionality of the LDX 80 Elite or LDX 80 WorldCam. With the e-License, the camera could function as the LDX 80 Elite and offer the ability to switch between 1080i, 720p and 1080PsF, or become the LDX 80 WorldCam and offer all the features of the LDX 80 Elite plus 1080p.

This option makes it easy and economical to have only the features that are needed for each project without having to invest in capabilities that are only needed occasionally.

Furthermore, with its LDX 86 Hi Speed (HS) Super Slow Motion Camera system and an e-License upgrade, rt1.tv has the opportunity to use the very popular XtremeSpeed functionality to provide advanced storytelling capabilities at premier sporting events. The capability can be unlocked easily as needed. The OB van market is highly competitive and requires businesses to stay one step ahead of the competition. Consumer expectations for image quality continue to rise as more and more HD/UHD viewing options hit the market, so it is up to the broadcasters to deliver the best video possible. By investing in the best solutions it can find, rt1.tv is well positioned to continue growing its OB van fleet and capturing new revenue opportunities across a variety of applications.

rt1.tv will showcase the new van for the first time at IBC 2015 in Amsterdam in September. It will join the growing fleet and provide advanced capabilities that enable the company to continue offering first-class broadcast services throughout Europe. Visitors to IBC 2015 will be able to see the van firsthand and tour the technology that represents the next step in OB van production.

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SNELL GROUP & _WIGE SOLUTIONS

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snell
A Quantel Company

Thomas Schaefer, _wige SOLUTIONS Technical Director, back at base with the Kahuna 9600

_wige SOLUTIONS drives the future with Kahuna German event service provider relies on Snell switcher power for live production

_wige SOLUTIONS, a subsidiary of leading sports communication company _wige MEDIA, has been providing event technology services to German and international customers for over 30 years. Headquartered in Meuspath, just a stone's throw from the famous Nurburgring motor racing circuit, _wige SOLUTIONS added a brand new mobile unit to its fleet in spring 2015 to further expand its outside broadcast capabilities and deliver the 3G and 4K production that is increasingly becoming a requirement at high quality events and car launches; the bigger the event, the more demanding the switching requirements.
To meet this need, _wige SOLUTIONS chose a 4K-ready Snell Kahuna 9600 production switcher. The Kahuna 9600 is in fact the sixth Kahuna switcher that _wige SOLUTIONS has purchased from Snell for its wide range of event productions. "In fact, we purchased our first Snell production switcher in 2005, and since then we have always returned to Snell for our switcher needs," says Thomas Schaefer, _wige SOLUTIONS Technical Director.

Flexibility and power

The Kahuna 9600 is available with up to 6M/Es, which can be repurposed to up to 24M/Es using Snell's Make ME technology. Because of the unique power of the Kahuna M/Es, which each support up to 12 key layers, _wige SOLUTIONS' choice of a 3M/E configuration meets all its current sophisticated needs and also provides headroom should expansion be required in future. _wige SOLUTIONS' Kahuna 9600 is currently configured with 48 inputs and 24 outputs.

_wige SOLUTIONS' HD OB truck, equipped with the Kahuna 9600

Snell's unique FormatFusion3 technology, which supports any input or output combination of SD, 720p and 1080i HD, 1080p and 4K without the need for external converters, also played an important role in _wige SOLUTIONS' choice of the Kahuna 9600. "The key reason for purchasing the Kahuna 9600 is that so many of the requests for proposals we now receive specify 3G-SDI," Schaefer explains.

Motoring ahead

"Motorsports is one of our main businesses," explains Schaefer. Among the major events covered by umbrella brand / parent company _wige MEDIA as a versatile media provider are Formula One, the Nurburgring 24 Hour race and the Truck Grand Prix. And for the DTM (German Touring Car series), _wige MEDIA provides complete TV production services for every event, supported by the Kahuna-equipped production van VIPER_2. The car connection goes further still; _wige SOLUTIONS provides on-site production facilities for new car launch extravaganzas for companies such as Mercedes, BMW and Audi. _wige SOLUTIONS ' Kahuna 9600 has also provided coverage of the Detroit Motor Show, the International Motor Show in Geneva and concert events such as Rock in the Park.

_wige SOLUTIONS Viper Truck at Hockenheimring

Fast and versatile

"When you're providing event services, you need to be very flexible and the Kahuna gives us the flexibility we need," Schaefer continues. FormatFusion3 plays a key role in delivering this flexibility. "The Kahuna 9600 is our flagship. The particular advantage of the Kahuna is that it can handle all types of input and output signals thanks to FormatFusion." The whole conversion process is handled by the switcher – with relatively little delay. While the latency in certain competitor switchers is sometimes longer when effects are added, the Kahuna only has a delay of one frame between input and output, even when using effects. "These are extraordinarily high requirements for a video switcher; when the public is sitting in front of a giant LED screen at an event and they can also physically see the person who is talking, it is very important to maintain synchronization and minimise the delay," says Schaefer.

Driving technology

The events business is one of the biggest drivers of technology development, always pushing for the next breakthrough. "We pride ourselves on always keeping one step ahead," says Schaefer. "When providing services for sophisticated events such as automobile exhibitions, we always have to use the very best, state-of-the-art technology. When several 4K signals have to be combined on a giant screen at an event, we have to deliver it."

"At motorsports events, a huge range of information is fed to the giant LED walls around the race track," Schaefer continues. "The overlay graphics which display the lap times must be large so they can be read from anywhere. To achieve this, we take the feed showing the action on the track produced by our colleagues in Cologne and combine it with timings graphics we create on-site to keep the viewers in the stands informed."

4K all the way

For this year's Le Mans 24 Hour race, _wige SOLUTIONS delivered a giant monitor wall with eight 3G-SDI signal inputs. "We operated a seamless video wall with two 4K images side-by-side; the monitors were arranged in two rows of four, and the video could be zoomed or shifted across all eight monitors, or large 16:9 pictures on two monitor pairs, or played out as a single HD signal across all eight monitors individually," Schaefer reports.

The key to success

"The Kahuna 9600 is unique in the number of keys which may be assigned to each of the M/Es – thus it's possible to overlay eight layers on a picture with just one M/E – these could be tickers, clocks, graphics, windows etc. Giving us even more flexibility, the Kahuna 9600 can also repurpose the M/Es using Snell's Make M/E technology, so you could even generate 12 M/Es and distribute keys accordingly on each of the 12 M/Es in an extreme situation," Schaefer adds.

Event requirements have also grown enormously over the years; in the past, the VIP hospitality area might have been in effect just a large beer tent. Today hospitality involves several large mobile buildings – sometimes even two-storey - each with its own demands for live event feeds. "Today we have to supply up to six different individual feeds from our control center. Such requirements can only be met with a video switcher that's highly flexible not only for the user but also in its configuration," Schaefer asserts. "In extreme operating conditions, we can connect several control panels to the single Kahuna mainframe and assign M/Es accordingly. This means we can split off certain operations to a second switcher operator."

Sharing the action on giant screens at Rock in the Park

Looking good

The Kahuna 9600 also integrates input and output color correction. "Color correction is important to us because we often have to operate in situations, where cost efficiency is an important issue. If any feeds are not yet color-corrected because no telemetry is available for them, these can easily be adjusted or aligned inside the Kahuna. Additionally we can also color-correct the output signals, so if an LED wall appears too red for example, I can quickly adjust the color so that it looks right for that particular condition," Schaefer explains.

Steering a path to the future

"While our current requirements can be met with the 3M/E configuration of the Kahuna 9600 we specified, there is room in the mainframe for future expansion if we need it, up to a maximum of six M/Es, which with the flexibility of the Kahuna architecture, would give us the equivalent of up to 24 M/Es in other systems," Schaefer adds. "Now we can play out our signals in 3G-SDI or 4K, and we still have M/Es to spare."

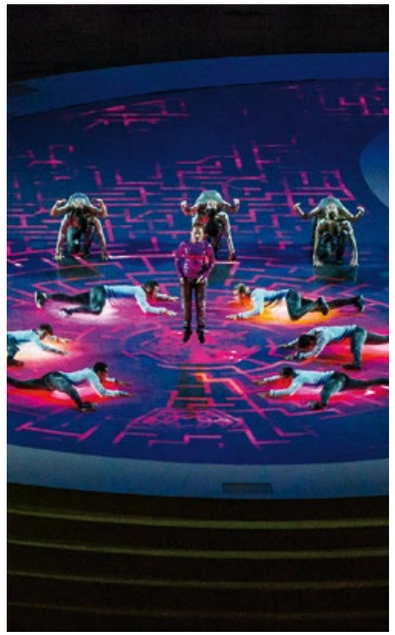
THE INTERCOM SOLUTION FOR THE EUROPEAN GAMES IN BAKU

The first ever European Games were held in Baku, Azerbaijan's capital city, at the end of June 2015 and followed the trend set by recent Olympics and other multi-sport events in the amount of broadcast coverage and technical complexity of its staging. The Opening and Closing Ceremonies were each a spectacle in their own right, involving elaborate production with full casts of performers. Each ceremony was made possible by technical crews working tirelessly behind the scenes, and a comprehensive Clear-Com communications system.

The P.A. People, an Australian integrator and contractor, provided the intercom, CCTV and technical services for the ceremonies' production systems. Company managing director Chris Dodds comments that what is expected of intercoms at events such as the European Games has increased considerably over the last ten years. "Since the 2000 Olympics in Sydney communications has become pretty much a discipline in the multi-event space," he says. "Sydney was comparatively small compared with what we do now - I think it had one radio repeater and about 100 radios and maybe 20 key stations - but it was the first event that attempted to use communications in an integrated way rather than just party line intercom and a bunch of two-way radios."

Four years later, Dodds explains, this had grown to approximately 20 repeaters at the 2004 Athens Games, although there were still no simplex interfaces. "Now, for Baku, we're talking 1200 radios and 100 interfaced bases," he adds. The P.A. People is one of two operations with the inventory and experience to handle installations of this kind. "What we're providing is reasonably specialised, not kit that gets used to anything like the same degree as professional audio or lighting. The return structures are very different and there's a pretty significant investment for doing something of this scale," Dodds says.

Despite the critical part intercom plays in a production of this kind, Dodds says it is not the organisers' first consideration: "Unfortunately communications is not the first cab off the rank. Usually we're one of the last technical contracts to be confirmed. For this event the tender package didn't come out until early November, it was decided by mid-December and from our point of view, because we are on the other side of the world with something like a ten-week shipping deadline, our equipment was shipped in the first week of February. So we had a six to seven week window, including Christmas, from appointment to dispatching the majority of our kit by sea freight to Baku." While The P.A. People positions itself as an independent provider tied only to manufacturers by choice, it is a regular user of Clear-Com systems. Clear-Com equipment was used for both the main stadium and the central rotating stage, known as the Revolve, during the



Opening Ceremony. The core installation, located in the Control Room, was based on two Clear-Com Eclipse HX-Omega frames linked using a fibre ring and offering a total of 380 ports. It also featured IVC-32 cards, over 100 interfaced radio channels, FOR-22's to interface with the radio bases and more than 200 IP-capable intercom panels for the Stadium, Rehearsal Tent and the Bulvar Cauldron. The matrix frames were interconnected using IP.

"The Eclipse HX-Omega is Clear-Com's biggest frame, supporting 15 interface cards," comments Dodds. "That was the central comms matrix, linked over fibre so there's a 1024 slot card linking those two frames that effectively made supported 380 ports total."

The intercom for the Rehearsal Tent comprised an Eclipse HX-Median frame with an IVC-32 card running 15 V-Series panels, linked over IP trunking. Another Median was the core of the system for the Revolve, which, as fitted the elaborate nature of its construction and the activities staged on it, had an extensive intercom system of its own. As well as the Median with featured two E-Que-HX cards for integration with FreeSpeak II wireless belt packs, it featured an IVC-32 and a MVX16 card to allow IP connectivity among V-Series key stations, nine HelixNet main stations, 70 HelixNet belt packs, 20 FreeSpeak II active antennas, two antenna splitters and 80 FreeSpeak II DECT-based belt packs.

The Revolve was an impressive piece of moving stage that created a striking center piece to the Opening Ceremony. Inside the revolve was the main stage which incorporated 18 separate lifts for the creation of a mountain towards the end of the performance, a lake with water pumped up and down into it and a grass effect.

"That meant there were operators for all of that - the level of technical complexity was extremely high," says Dodds. "We used no electrical connection to the Revolve other than the power, so the intercom system had a separate, stand-alone Median frame. It was quite a complex system and probably bigger than the sort many people put together for these kinds of events on its own. That system enabled coordination of all the set pieces and crew so they could manage everything. The crew on the Revolve included their own programming computer with an operator and crew that were on the Revolve for the period of its rotation."

Because of the position of the Revolve in the middle of the stadium, and the shear number of crew moving around on it during the ceremony to ensure everything went smoothly, wireless radio packs were crucial. Dodds and his team selected FreeSpeak II for this important role but had to be cunning in configuring the system to get the necessary number of connections. "The 80 FreeSpeak II packs in one location was reasonably novel," Dodds says. "FreeSpeak II, like any DECT-based system, has a maximum capacity governed by the number of slots in the DECT standard, which is effectively 50 packs. To get to 80 we had two complete systems operating in two different DECT frequency bands, which were then co-located.

Baku 2015
1st EUROPEAN GAMES

Clear-Com
AN HME COMPANY

The P.A. People

That required dispensation from the authorities to give us access to extra spectrum, which came from space usually allocated to Cell Phonestest bands. Not only is this the first time somebody got a full duplex system to work for the Opening Ceremony, but we made two work at this scale in the same space at the same time - which is a tribute to the Clear-Com product." As the primary point-to-point intercom system for high-level users and control room operators the Eclipse HX matrix connected to in the region of 200 rack-mounted 12 or 24 channel intercom stations. It additionally interfaced with two-way radios through the 100 channels of base radio. "The system also interfaced to HelixNet, which is Clear-Com's networked digital party line intercom," Dodds comments. "You've got all of those aspects together. Then FreeSpeak was added using its full-duplex capability. What we had was a whole bunch of intercom technologies effectively tied together through the Eclipse HX matrix."

The total of 380 audio paths was reached through a combination of 100 base radios and 200 key stations connected to the matrix, giving 300 connections, with the remaining 80 used for various I/O lines to the audio system, the HelixNet and sending five channels of audio to FM receivers. These were used for talkback to members of the cast, giving cues and other information during the show. "You might have a choreographer standing in front of a Clear-Com matrix panel and they would have the ability to talk to each of the five channels of the FM signal transmitting to the cast," Dodds explains. "This facility is also used by the director, the stage managers and the technical direction team, who might had 40 to 50 keys on their panels because the Ceremonies were incredibly complex. Simply put, on an event like this the comms system is large and mission critical. It has to be because of the level of technical difficulty of the show."
While the fifteen strong crew from The P.A. People led by Campbell Waller and Paul Barrett is highly experienced in this kind of event, it was supported on site by two of Clear-Com's staff, John Ruest and Ivan Tobigah. "The support from Clear-Com was astounding," says Chris Dodds. "Their guys were really on their game and addressed any issues we had. There's no question, a production of this scale pushes any of these systems to the brink - but they coped marvellously."

STAGE TEC FOR STAGE ENTERTAINMENT'S MIRACLE

To many Germans, the feeling of elation when the German soccer team won the World Cup in 1954 is a defining moment in the country's post-war history, and arguably the trigger for the German "Wirtschaftswunder" or "economic miracle". That triumph meant so much to Germans that even the late film director Rainer Werner Fassbinder used the original broadcast commentary in one of his films.

In 2003, Sönke Wortmann released his tremendously successful movie "Das Wunder von Bern". As one of Germany's bestselling films ever, the movie storyline served as a starting point for the musical produced by the Hamburg-based company, Stage Entertainment. Set against the backdrop of Germany's miraculous win, the musical tells the story of a family who gradually learn to appreciate their father after his unexpected return from a Siberian prison camp. The show opened on 23rd November 2014 and is a resounding success.

With eight shows a week, over 20,000 tickets sold in a matter of weeks, rave press reviews, and the biggest LED screen ever installed in a theatre for a spectacular recreation of the legendary final, the musical almost looks like a miracle in its own right. Stage Entertainment is famous for its brilliant musical productions, which draw huge crowds, not just in Hamburg but also in Berlin and other German cities. The company's success is a result of making the right choices regarding plots, authors and composers, top-notch casts, spectacular effects, a "something for everyone" approach to emotional balance, and meticulous preparation. Delays before show time, no matter how small, can have an adverse effect on the company's image, whilst shows cancelled for technical reasons would simply be a disaster. With this in mind, the decision was made to use an Aurus console, a Nexus Star router with seven DSP cards and six Nexus base devices installed in strategic positions. The set-up accommodates over 90 microphone inputs, some 120 analogue line inputs and outputs as well as 32 AES inputs and outputs for outboard effects processors and power amplifiers.

Ten Years And Counting

Stage Entertainment knew that only a Stage Tec system would be able to provide the consistency, flexibility and redundancy options required. Other productions such as "Rocky" and "Hinterm Horizont" have been running for two-and-a-half and five years respectively, without the slightest technical issue. Apart from the reliability, the sound quality of the Stage Tec TrueMatch convertors is said to be second to none, whilst Nexus routers provide endless options for sound reinforcement applications and beyond.

Under the supervision of Production Sound Engineer Andreas Hammerich, Christian Fuchs and a team of both internal and external sound engineers set up a vast number of KV2 point source speakers, some of these used for sound effects. Fuchs also programmed the Nexus Logic Control system, the Aurus scene memories and the venue's DELEC intercom system.

In addition to the aforementioned analogue and digital I/O, the Stage Tec system at Hamburg's Stage Theatre includes five MADI cards and one Dante audio over IP card. A single port is used by the four computers in the keyboard section and the two computers storing the sound effects, which were prepared by the Sound Designers John Shivers and David Patridge.

Department Of Redundancy

One of the most important aspects of first-rate productions is that the show is able to continue no matter what. Redundancy, i.e., the fact that a backup device can take over from a faulty one, is therefore of the utmost importance. Most redundancy routines were programmed using the Nexus Logic Control system to allow for seamless, automatic switching to a backup device as and when necessary. This cautious approach explains why, for instance, there are four computers for the keyboards (and two for the sound effects). Only two (or sometimes one) are actually used during the show - the others are on standby in case the respective primary device fails.

The same redundancy is applied to the audio signals triggered from the lighting mixer, audio mixers, as well as the MIDI signals routed to the video devices. The SMPTE timecode provided by the video devices can be sent via different routes when required. Virtually every critical connection or device is duplicated and can be (re)routed through Nexus.

Distributed Control

'For musical productions, Nexus can do a lot more than just audio,' Christian Fuchs explains. For "Das Wunder von Bern," the conductor has a panel with just one key, which is connected to a GPI relay inside a Nexus router and used to generate MIDI commands that trigger sound effects. Due to the fact that its assignment can be changed within each Aurus scene, the MIDI commands transmitted by that key can vary.

This clever system makes errors virtually impossible, as the key always has the "correct" function. The Aurus scenes containing these assignments, among many other settings, are recalled by the FOH sound engineer. A similar system is used for musicians who play different instruments, like different saxophones and flutes, several guitars, or different brass instruments. To keep things manageable for the FOH engineer, all multi-instrumentalists are surrounded by several microphones and foot switches – again GPI implementations – used to activate or mute Nexus inputs, so that the sound engineer does not have to worry about that aspect. When human error occurs and a musician presses the wrong footswitch, a safety measure is in place where each footswitch press also highlights a button on the dedicated Aurus console to inform the sound engineer of the changed state of a Nexus input. If the sound engineer believes that the wrong input was activated, he or she is able to override that setting manually.

All of these functions are programmed using the Nexus Logic Control software, which comes as standard for all Stage Tec consoles. Another application implemented via Logic Control is used for the Sennheiser 40-channel radio microphone system. For each receiver channel strip, a routine was programmed that allows the FOH sound engineer to press the button above the Aurus channel fader in question to display a message on the PC in the radio room (where the radio microphones are managed). For example, the message could tell the tech to check Matthias's microphone, in case there is something wrong with the main character's microphone signal. This system is available for all 40 radio channels.

Logically...

Although all control and redundancy functions mentioned so far can be programmed in less than three days, the process usually takes longer. This is because new ideas surface during rehearsals, sometimes involving complete rewrites of a given scene and therefore also of the routines that may already be complete. The same applies to changes to the musical arrangements and the number of musicians. 'What is often forgotten,' says Fuchs, 'is that it is usually wise to remove all lines of logic code that have become obsolete lest they should wreak havoc at some unexpected stage.'

There is most probably not a "correct" way to program Nexus Logic Control. This flexibility however also means that programmers need to prepare a document that explains what each routine does and how it was implemented. After all, the shortest route may not always include the required redundancy options, and so a slightly more complex approach must be chosen. A clear and comprehensive explanatory document is of the upmost importance as other users need to be able to understand the programmer's reasoning and the programmer is usually not the sound engineer who operates the FOH console during the show. There may also be more than one sound engineer on call.

Some corrections to existing routines for the musical were programmed offline, in a different city, and then e-mailed to the sound production manager. One effects device, for instance, had difficulties with the digital signals it received. Fuchs consequently provided a Logic Control routine that automatically "closes" the effects loop, bypassing the device whenever the error occurs, as only one model of that device was available, making redundant switching impossible. All Nexus Logic Control routines are stored inside the Nexus CPU card – no external PC is required to run the show.

Listening In

While the entire FOH mix is managed from the 120-channel Aurus console (48 faders), additional mixers are used for monitoring purposes. This includes a Yamaha PM1D console connected via MADI for the monitoring pre-mix which has signals transmitted to 13 Roland M48 personal monitoring mixers – one for each of the 12 musicians, and one for the radio room where the radio mics are managed. For musical productions, in-ear systems are only used in extreme situations, i.e. for awkward placements of actors or positions where the delay caused by a remote speaker system would cause timing problems. An on-stage, wide-area coverage speaker system is usually preferred. Given the complex stage scenery of "Das Wunder von Bern", with elements moving in and out in all directions – left, right, bottom, top – there are four speaker systems on either side of the stage to ensure that the artists and dancers on stage get the right cues and hear everything they need to for their performance. Switching between speaker rows is again performed automatically, using trigger signals from Aurus scene memories.

All In All

High-profile live productions require reliable equipment. Obviously, Andreas Hammerich, the Production Sound Engineer and Sound Coordinator for Stage Entertainment's "Das Wunder von Bern" has ensured that back-up power amplifiers and speakers are available in the event that one of them unexpectedly goes offline. And Stage Tec's Aurus and Nexus provide programmable redundancy scenarios as standard. Finally, there is still the question of what to do if the device itself has problems. To this, Andreas Hammerich says the following; 'People in the sound reinforcement business keep saying that the nice thing about Stage Tec equipment is that if it can be switched on without a glitch, you can be pretty sure that it will work flawlessly. Possible software quirks either occur at the boot-up stage or they simply don't happen.'

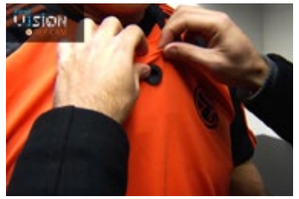
TURKISH AIRLINES FINAL FOUR MADRID 2015 | 3D STORM | The INSIDER presented by TURKISH AIRLINES | MULTIWEBDIA DIGITAL CREATIVITY

NEWTEK TRICASTER MINI AT THE HEART OF THE TURKISH AIRLINES EUROLEAGUE FINAL FOUR 2015

The 2015 Turkish Airlines Euroleague Final Four was held in Spain, at the Barclaycard Center of Madrid, on May 15 to 17. During the three-day event, the four best European basketball teams of this year's tournament, battled fiercely to win the title. This year, the organizer deployed an impressive production workflow, to offer a unique experience to viewers on site, as well as followers, fans and viewers in front of their screens.
Multiwebdia, a production company and digital content creation agency based in Spain chose TriCaster Mini, the ultra compact production system from NewTek, to be the centerpiece of the production system during the 2015 Final Four.

Pair GoPro and TriCaster Mini

The Euroleague Basketball and his main partner Turkish Airlines were looking for an effective way to broadcast live the several pieces of content recorded for The Insider during the 2015 Turkish Airlines Euroleague Final Four. The Insider is a project conceived in order to make video content and an insider's look, accessible to basketball fans wherever they are watching the games. To provide even more behind the scene insights and exclusives, three legendary players were involved in the adventure: Joe Arlaukas, Theo Papaloukas and Sasha Djordjevic. And, last but not least, a camera was placed right inside the middle of the action: two referees wore a jersey cam in all games, bringing the fan directly on court.



Feeding several platforms The Insider provides exclusive video content, such as interviews with the players, behind-the-scene content, after match events...in order to engage viewers with unseen and exclusive content. The technical setup for this amazing viewer experience included 5 Go-Pro cameras placed all around the field, in order to have different views of the game. The referees also had a button camera on their shirt to get a closer look at the game. The signals were sent to TriCaster Mini, the centerpiece of the production and broadcasting of The Insider content.

The biggest challenge for this production was cabling. The difficulty was to carry the signal of multiple cameras on distances over 500 meters. They worked with fiber optics and a set of converters in order to optimize the video signals feeding the TriCasters. "The two TriCaster Mini were the central hub of the whole project" says Bernat Martinez, owner and creative director at Multiwebdia, "TriCaster is not only a video mixer, it is a complete production system that allows any producer to have last minute ideas, to be able to implement them within minutes, with high quality video content".

LiveMixer and Third Party

With that many incoming camera feeds, they used two TriCaster Mini systems. TriCaster Mini, the most compact live production system from NewTek, sports 4 simultaneous live video sources over HDMI. The cameras were connecting to the TriCaster video inputs through a BlackMagic Matrix 12 x 12 SDI and converters from SDI to HDMI. TriCaster Mini also has 2 network inputs to connect external computers over IP, or any partner product supporting NewTek AirSendTM protocol. The IP connections were used to create and display the graphics, the titles and lower third, as well as the partners advertising. "We chose to use TriCaster for its versatility" Says Bernat Martinez, "its ease of use and most of all the insurance it gives us to flawlessly work with other systems".

Part of the video content included one-on-one interviews with players and coaches. They used a JVC GY-HM200 SDI camera and microphones by Shure. The incoming sound was mixed with a Yamaha 01V96i Digital Mixer connected to the TriCaster, via the USB port. In order to automatically control the sound on the Yamaha mixer and synchronize it with the TriCaster, they used LiveMixer, the TriCaster audio mixer remote control, from the LiveXpert line of products.

With LiveMixer installed on TriCaster, they could easily configure and link independently each audio channel of the TriCaster to a fader on the Yamaha mixer. LiveMixer eases audio control by having a dedicated station for sound control.

Multiple destinations

For this event 4 live streaming channels in full HD were set and simultaneously active. Using the two HDMI outputs of each TriCaster, the content was directly streamed live to a YouTube channel, using the integrated streaming engine of the TriCaster. The content produced was also sent to feed the in-house channel of the Barclaycards Center of Madrid aiming to internal broadcasting, using converters from HDMI to SDI to overcome the distance issue.

The tool offered a 360° in arena experience no matter on which screen fans were watching the game. TriCaster Mini has all the functions inherent to all TriCaster models of the ProLine. The small footprint of the system is a big advantage, as it makes it easy to carry, easy to move if needed, and as easy to set up, but still powerful. "NewTek products contribute a lot to the sports production industry", concludes Bernat, "especially in Europe, they create solutions to answer today's reality for video and events producers." Graduated from the Center of Image and Multimedia Technology at the University Polytechnical of Catalogna, Bernat Martinez, creative director and owner of Multiwebdia has worked in the sports production industry for 15 years, and mainly with NewTek TriCaster for the past 4 years.

About Multiwebdia

Multimedia is a creative agency dedicated to developing creative multimedia projects. He has over 15 years of experience in the creative sector, providing digital graphics, audio visual production and creative for professionals and companies in all sectors.
It also has a long history in organizing international sports events in the graphic and audiovisual sector.

About Euroleague Basketball and Turkish Airlines

A global leader in sports management, Euroleague Basketball is enjoying its second decade of sustained growth as an innovative organizer of elite competitions and events. Euroleague Basketball was founded in 2000 under a private organizational model considered a breakthrough for European professional team sports. It now manages the continent's two premier basketball competitions, the Turkish Airlines Euroleague and the Eurocup, consisting of 72 teams from as many as 25 countries. Each season culminates in the naming of a continental champion at the Turkish Airlines Euroleague Final Four, now a signature event on the world sports calendar. Established in 1933 with a fleet of only five airplanes, Star Alliance member Turkish Airlines is today a four-star airline with a fleet of 234 aircraft (passenger and cargo) flying to 243 cities around the world. One of the fastest growing airlines, it has received several "Passenger Choice Awards" from Airline Passenger Experience Association (APEX). In 2015, Turkish Airlines, for the fifth consecutive year, was named "Best Airline in Europe" by Skytrax.

About 3D Storm

3D Storm is the official distributor of NewTek and LiveXpert products. Sports scoring and statistics, graphics management and social media integration, 3D Storm solutions for live video and sports productions, round out control room equipment in TV studios and conference facilities, mobile control rooms for entertainment and sports events, as well as outside broadcast vans.

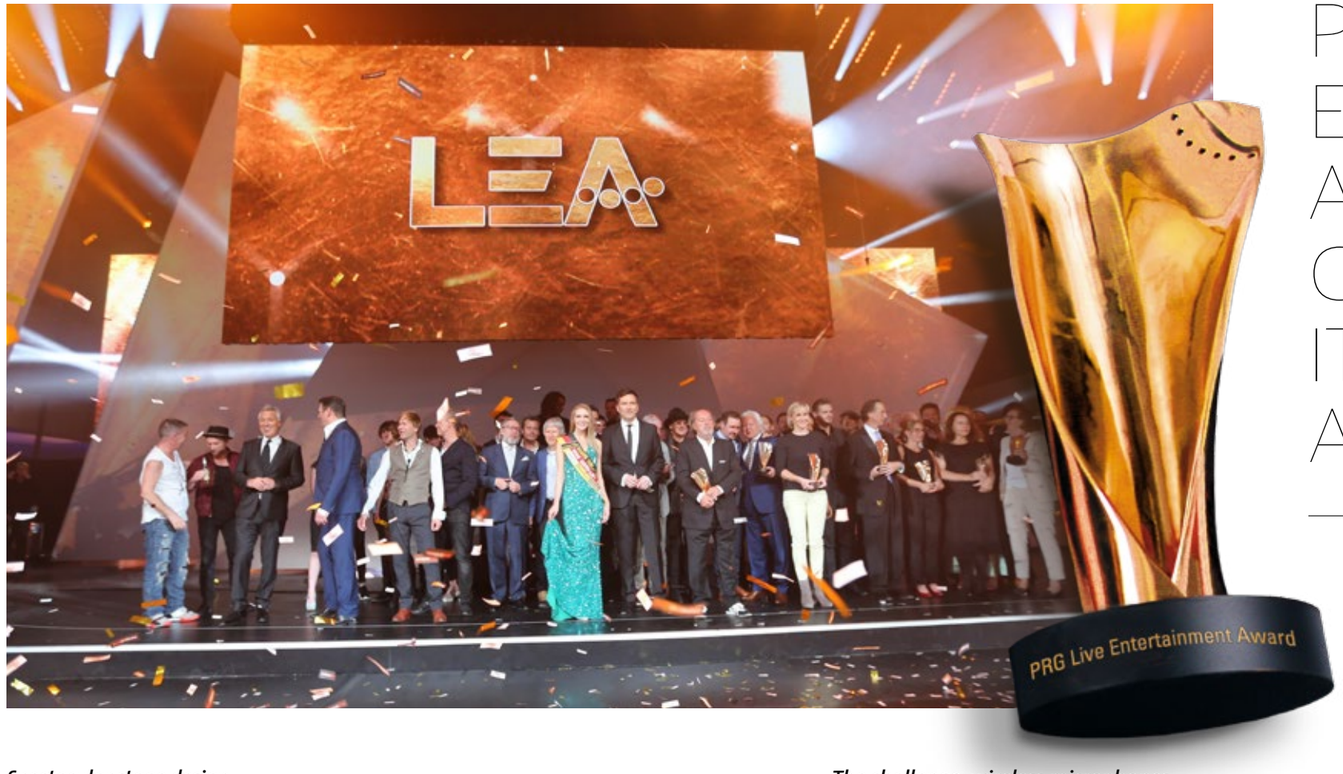
PRG LIVE ENTERTAINMENT AWARD CELEBRATES ITS 10TH ANNIVERSARY

Spectacular gala event in Frankfurt's Festhalle

For the tenth time now, the PRG Live Entertainment Awards (PRG LEA) were presented on 14 April 2015 in the festival hall in Frankfurt in front of an audience of over 1,300 guests from the national and international music, event and entertainment scenes. With a total of 15 awards, event organisers, artist managers, concert agents, venue operators and artists were recognised for their excellent achievements in the live entertainment industry. The PRG LEA gives all the creative players and organisers who contribute great ideas and extraordinary energy to the work behind the scenes the opportunity to have their special achievements in the show and entertainment industry acknowledged. Only music journalists and professionals from the live entertainment sector form the expert jury who decide on nominations. Star-studded national and international live acts such as Spandau Ballet, Marit Larsen, Johannes Oerding, Wanda and Jan-Josef Liefers' Radio Doria delighted the many guests with their thrilling acts on the stage. TV journalist Ingo Nommsen gave a masterful performance as moderator through this entertaining show. Amongst the many prominent and illustrious guests were Till Brönner, Campino, Klaus Eberhartinger, Elaiza, Greenbird, Motsi Mabuse, George McCrae, Patrick Owomoyela, Marco Russ and Marius Müller Westernhagen. Despite all the glitz and glamour of this brilliant live show, the audience was moved by one special prize awarded spontaneously on the night by the organisers. The manager of Die Toten Hosen Joachen Hülder, who passed away in January 2015, was recognised posthumously for his life's work as artist manager. Singer and front man Campino himself accepted the award for Hülder in this emotional moment.

LEA success story

Since its premiere 2006 in the theatre tent of the Fliegende Bauten ensemble in Hamburg, the LEA has become one of the major awards in the entertainment industry in the category of ECHO and Deutscher Filmpreis in just only ten years and has established itself as one of the most important German cultural awards. The stylised concert ticket – solid bronze cast weighing 3.5 kilograms – has now become a much coveted trophy in the show and event sector. The LEA nominees and award winners reflect the entire spectrum of the live show and entertainment scenes, with all their creativity, innovative ideas and success stories.



Spectacular stage design

The PRG Live Entertainment Award 2015 hosted an impressive live show with an awe-inspiring and varying stage design and extraordinary technical equipment. The stage set, built out of white, polygonal elements, could be moved during the entire show by means of many motors at different positions. With eight high-power video projectors, changing motifs and diverse backgrounds were projected onto the white surfaces – synchronised to the performances and moderation on the stage. With over 700 lighting fixtures, Germany's top light designer Jerry Appelt (also responsible for the design of the Eurovision Song Contest 2011 in Düsseldorf) lit the stage with different lighting effects and moved the show through different moods. Reducing power consumption was also taken into account here with the use of high-efficiency LED lamps.

MICROPHONE TECHNOLOGY

Technology

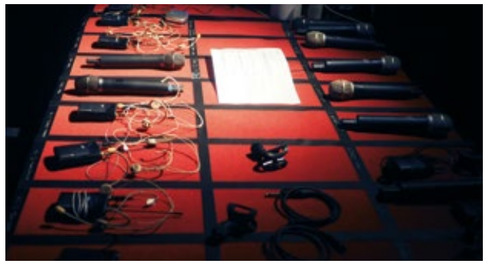
As the exclusive microphone partner of PRG LEA 2015, beyerdynamic miked up the show and the stage with its TG 1000 digital wireless system and diverse corded microphones. The technical setup was divided into two areas: microphones for the show moderation and laudatory speeches, and microphones for the live performances.

The challenge: wireless microphones

beyerdynamic's TG 1000 is a remarkably reliable digital 24-bit wireless system. With an impressive bandwidth coverage of 319 MHz in the UHF range (470-789 MHz), the TG 1000 can be used for a wide range of applications worldwide. A total of 28 channels were used with the TG 1000: 16 channels serving the live performances and 12 for the moderation and speeches.

As an event venue, Frankfurt am Main generally poses a major challenge for such a production with many wireless channels because there are eight DVB-T channels there that block a large part of the available frequency spectrum. The music fair taking place at the same time in the neighbouring exhibition halls complicated the problem by occupying additional frequencies. The use of many LED lamps and walls during the spectacular shows on the stage and the HF interference they pose was also an added problem to using wireless microphones.

On top of the 28 TG 1000 channels, another 10 in-ear monitoring paths and 18 additional wireless microphones from Spandau Ballet had to be operated reliably. They were the only live act to use their own microphones independently. Frequency coordination in such surroundings is therefore the most important part of the preparation and production of such an event and allows you to react quickly to unexpected situations. And such a situation did arise: during the event (and in spite of prohibiting them in advance), ENG teams were using wireless microphones on the same transmission frequencies as the event microphones in the hall and therefore caused massive transmission problems. Fortunately, these "disruptions" could be kept to a minimum, but only thanks to good teamwork and switching to alternative frequencies quickly.



Despite all these difficulties, the TG 1000 digital wireless system from beyerdynamic was again able to demonstrate its formidable performance to the full. Especially its impressive frequency range, which offers a high level of flexibility, made it a lot easier to find alternative available frequencies.

Flexible microphone technology for the moderation

Moderator Ingo Nommsen was kitted up with a TG H55c and a TG 1000 beltpack transmitter as the main microphone and had a handheld transmitter with TG V96w interchangeable microphone capsule in his jacket pocket for his interview partners. Apart from the moderator, there were two more speakers with their own TG H55c headset microphones for their laudatory speeches. A special highlight was the Classis GM 302 gooseneck microphone that was available for the laudatory speeches as a speaker microphone. The mobile podium was another spectacular feature equipped with two wireless Classis GM 304 microphones and a TG 1000 beltpack transmitter. Further beltpack transmitters were used to capture the sound of a ukulele and other guitars that accompanied some of the laudatory speeches. There was also a spare beltpack and handheld transmitter available for Ingo Nommsen, which, however, were not needed.

Tried-and-tested equipment for instruments

A wide range of different corded microphones were used for capturing instruments. This included small diaphragm true condensor microphones (16 x MC 930) used as overhead microphones. The frequency-independent cardioid polar pattern ensures the necessary directivity on a full stage. The condensor clip-on microphones (8 x TG D57c, 8 x TG D58c) were ready for action quickly thanks to an integrated pre-amplifier. Dynamic microphones deliver a solid sound and were therefore also used for snare drums and kick drums (10 x TG D50d, 5 x TG D70d). The M 88 TG dynamic microphone was chosen for the guitar amplifiers.

Two MC 930 microphones were used as atmosphere microphones together with a pair of WA-ATDA passive/active rotational wideband antennas. These microphones transmit the atmosphere for the in-ear monitoring systems that the artists use. Without them, the artists would not be able to hear the audience at all.

As vocal microphones in the live performances, handheld transmitters with TG V50w interchangeable microphone capsules were used exclusively by the singers. Guitar and bass amplifiers were captured with both M160 and M88 TG as well as TG I50d microphones. And for the drums, the show made use of the entire range of beyerdynamic drum microphone technology: TG D70d for kick, TG D50d for snare top, M201 as snare bottom microphone, MC 950 for hihat, TG D57d and TG D58d on the toms and MC 930 as overhead microphones. The MKV 87 proved its excellence again as an extremely practical and sturdy microphone clamp. Each live act was able to leave their backline (instruments, amplifiers, etc.) set up on risers (rolling platforms) backstage which meant that the microphones were also left on the instruments. This saved a great amount of time normally needed for changing the set-up between each act, and the microphones could be perfectly positioned beforehand at the soundcheck. Only the vocal microphones needed to be distributed between the different acts and sometimes had to be used twice.

All in all, the TG 1000 digital wireless system and microphone technology from beyerdynamic was a clear winner with its ease of handling and especially its impressive sound at this technically challenging live event

THE AWARD WINNERS 2015

LIFE'S WORK

Winner: Peter Rieger (Peter Rieger Konzertdirektion, Cologne)
Laudatory speech: John Giddings

JURY AWARD

Winner: Karsten Jahnke – "JazzNights" tours and concerts
Laudatory speech: Peter Urban

ARENA / STADIUM TOUR OF THE YEAR

Winner: Justin Timberlake ("The 20/20 Experience") – Marek Lieberberg Konzertagentur
Laudatory speech: Spandau Ballet

INDOOR CONCERT TOUR OF THE YEAR

Winner: Marteria ("Zum Glück in die Zukunft 2") – Four Artists Booking
Laudatory speech: Patrick Owomoyela

CLUB TOUR OF THE YEAR (presented by Ströer)

Winner: Marius Müller-Westernhagen ("Alphatier Pre-Listening Tour 2014") – Deutsche Entertainment AG
Laudatory speech: Elaiza

CONCERT OF THE YEAR

Winner: The Rolling Stones, Waldbühne Berlin, 10 June 2014 – Deutsche Entertainment AG
Laudatory speech: Lars Redlich

SHOW OF THE YEAR

Winner: Cirque du Soleil ("KOOZA") – Marek Lieberberg Konzertagentur
Laudatory speech: Timo Wopp

FESTIVAL OF THE YEAR (presented by PRG)

Winner: Rock am Ring / Rock im Park – Marek Lieberberg Konzertagentur
Laudatory speech: Jan-Josef Liefers

INDOOR CONCERT VENUE / ARENA OF THE YEAR

Winner: Tempodrom, Berlin (Tempodrom Betriebsgesellschaft)
Laudatory speech: Florian Schroeder

CLUB OF THE YEAR

Winner: Zeche, Bochum – Zeche Bochum GmbH
Laudatory speech: Mrs. Greenbird

EVENT ORGANISER OF THE YEAR

Winner: Wizard Promotions, Frankfurt am Main
Laudatory speech: Gerd Gebhardt

LOCAL ORGANISER OF THE YEAR

Winner: ARGO Konzerte, Würzburg
Laudatory speech: Sonya Kraus

ARTIST MANAGER / AGENT OF THE YEAR (presented by IMUC)

Winner: Sascha Stadler – VOLL: kontakt Artist Management (Management of Revolverheld)
Laudatory speech: Johannes Oerding

HONORARY AWARD FOR LIFE'S WORK IN ARTIST MANAGEMENT

Winner: Jochen Hülder – JKP Jochens Kleine Plattenfirma (Management of Die Toten Hosen)
Words of commemoration: Marek Lieberberg

ARTIST / YOUNG TALENT PROMOTER OF THE YEAR

Winner: New Music Award – organised by Four Artists Booking on behalf of ARD-Jugendwellen (overall responsibility: Fritz / RBB)
Laudatory speech: Tonbandgerät

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SHINEAUSTRALIA BroaMan

MUX22 THE PERFECT SOLUTION FOR SHINE AUSTRALIA

When German fibre network specialists BroaMan introduced their Mux22 they fully unlocked the potential of a self-contained and energy-efficient system that would give their broadcast customers the ability to transport a variety of audio, video and data signals over fibre. The BroaMan solution would enable professional video signals to be sent, received and converted — including SD, HD and 3G-SDI — with or without audio, intercom and data. The scalable architecture could also be interfaced to audio and data network systems, such as Optocore, SANE, MADI and Ethernet, to provide an excellent and consummate transmission solution. Thus the introduction of the Mux22 and Mux22 MADI, supporting up to eight video channels with a selectable number of dual inputs and dual outputs, further caught the imagination of broadcasters looking to combine video and audio signal routing to multiple locations over optical fibre — particularly since it was protocol independent and was contained in an economical 1U rackspace. It has quickly taken off in Europe and Scandinavia before migrating to the other side of the world, where leading Australian production company Shine Australia has recently become another early adopter.

"We have a unique setup," explained technical manager, Nick Parker, who had been responsible for the Mux22 procurement. "We have production and post production integrated as part of the same company, which allows our technical team to be across both aspects of the shows, and innovate on these workflows. The technical services group is able to use resources across both post and production and it allows us to put equipment in on a show-by-show basis." Shine deploys its own studio hardware for smaller shows such as Masterchef, Biggest Loser, The Bachelor, The Face, Top Model etc while for the larger shows they will contract external outside broadcast or rental houses to supply gear. Those prime time light entertainment franchises attract major viewing audiences — and the production company needed to find a cost-effective solution that would meet all their many requirements in a single environment.

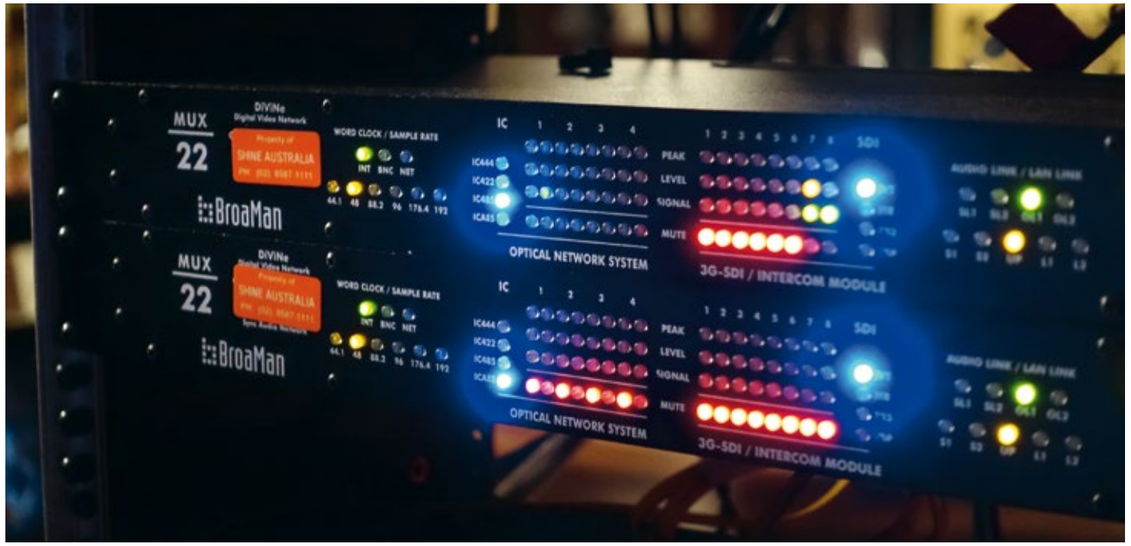
"I had seen Optocore at IBC and NAB in previous years — but it was the BroaMan development that really interested me," Nick reports.

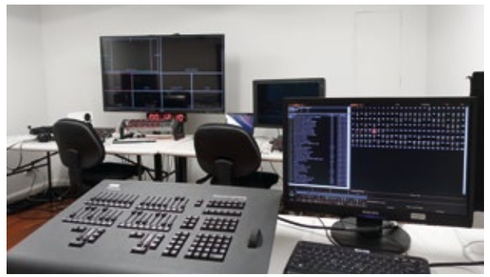
And the cause of his interest was the fact that other network transmission systems Shine had reviewed had either been cost prohibitive or simply didn't meet their requirements. "For instance, one was video only rather than a true stage box, while another was messy, with lots of adapters and fibre cores all doing the same thing."

But at the Australian Grand Prix an encounter with Patrick Hendriks from BP Satellite Solutions, whom he had met while working with him and Multi-Link Holland's Bob Snieder on a project for RTL Germany — was all the convincing necessary. "We got to discuss Multi-Link Holland's MUX22 system compared to other systems we had reviewed — and from the brief chat it sounded like it was everything we needed. In fact Mux22 was a stand-out product from the moment I was introduced. It had all of our required features and allowed for the ability to scale to our future needs. Various configurations were available, and through CWDM a single fibre pair had the ability to carry a multitude of signals."

Initially Shine Australia had taken a system on trial to replace their existing solution, on the Bachelor Australia (Series 3). "It has been working faultlessly," he reports. "As a result, we plan to use the Mux22 on the forthcoming finale of The Biggest Loser and also Sharktank Series 2. Shine Australia has the device configured to transport six HDSDI inputs and two HDSDI outputs. AES on one system allows for AES/EBU audio — along with four communications panels for the studio floor.

"IC485 which is RS485 and Analogue Audio, is also great as you can run these ports as RTS Communications Panels or as IFB's or Sends to the studio floor ... or a mixture. The system allows for Gigabit Ethernet and also is conveniently switched on the unit for additional ports."





"The Mux 22 includes GPI's which is great for any remote triggers required," he continues. In its current configuration Shine Australia is using the MUX 22 IC485 with two UHF radio bases and are triggering the Push to Talk via the GPI, while the audio is transported via the IC485 ports. Nick states that while many fibre systems exist in the market most of them don't cover as much functionality as the Mux 22 with 8 or even 16 x SDI Video, Fast Ethernet Data, GPIO; with Audio Options (AES, MADI, Analogue, IC485), bandwidth-independent Fibre Pass Though, Ability to run Communications Panels (RTS, Riedel or Clear-Com).The system scales with the SANE Optocore network and the possibilities on your audio capacity grow to a large scale audio network when required."The system has proved itself as a plug and play and has been very robust from the moment it was installed ... we haven't had any issues or need to reconfigure." Shine Australia has also promoted the Mux22 solution to two big OB providers who also find the system they are presently using too expensive. "When our Mux 22's aren't in use I think a high demand on demonstrations from both will be in order!" he states.

"The Mux22 is highly versatile in the reality production space — but we aren't always shooting in a real studio. It might be a temporary warehouse or a converted wharf or a shed on a tennis court (Bachelor Australia for instance is shot in a converted private residence outside Sydney). This site required a temporary fit out where we built a studio on a tennis court, and a control room in the basement of the house hold; this meant we needed to get creative on how we got signals from the tennis court back to the control room. The Mux22 answered all these questions."

In fact they are constantly facing challenges about how far cables can be run, how quickly they can be installed and the system built. "Mux22 gives us the ability to take on these shows and not have as many challenges as before," confirms Nick.

It provides not only an elegant solution but a highly cost-effective one, with the minimum of cable runs. "Always when building a studio, running cable is the biggest issue, and this has given us a new way to keep costs down and still give us the full feature set we require on a constant changing production environment. If you count the amount of I/O that the Mux22 can handle — running the same amount of cables compared to the single fibre cable — this is the biggest way it keeps costs down, with all the feeds that we can run through just two pairs of single mode fibre!" And as for system set-up and operability, to a technician as accomplished as Nick Parker it was little more than plug and play. "I needed nothing more than the manual — and I was then able to train our junior engineers in an hour as to how the system works."

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AUGMENTED REALITY GRAPHICS WORLD CUP STUDIO

During the World Cup (skiing) at Falun, NRK used augmented reality (AR) graphics in the studio for the evening broadcasts with Anne Rimmen and Thomas Alsgaard. This was the first time broadcasting with a new tracking system.

What is AR?

Television production distinguishes between augmented reality (AR) and virtual reality (VR). The traditional form of VR is when a presenter is keyed or cut out and placed into a graphic generated virtual studio. This is used in NRK programs such as SuperNytt. In a lot of ways AR is the opposite of VR: Instead of placing a real object into a graphical world, you place a graphic element into the real world. The goal is to create the illusion that the graphics exist in the physical TV studio. Traditional TV graphics placed on top of the camera images and do not react to changes in the image. With AR, the graphics retain their position in the room when the camera moves. You could for example, place a graphic element on a table, and the graphic will keep its position on the table when the camera moves in the studio. To achieve this, the graphics system needs to know how the physical camera in the studio moves. This is known as "tracking".

How does it work?

AR graphics work by having the real camera movements matched up with a virtual camera that is internal in the graphics rendering software. If the real camera is moving to the left and zooms in, the internal virtual camera in the graphics engine does the same. Viewers get the impression that the graphics and the live images are connected. To achieve this camera tracking, all you need is a system for continuous reading of the camera's position; pan, tilt, zoom, focus, height and so on.

In this production NRK used for the first time a tracking system from Stype GRIP. This is a mechanical tracking system for the Stanton Jimmy Jib camera crane. The Stype GRIP tracking system is connected to the crane and includes a pair of sensors on the crane base and sensors on the crane arm. This gives continuous data on the pan and tilt of the crane arm, and information on the pan and tilt of the camera. In addition, decoders on the camera read focus and zoom.

Data from Stype GRIP is then sent over ethernet cable to the graphics engine to interpret the data stream. At NRK we use tools from the Norwegian company Vizrt in most productions. They provide a real-time 3D graphics system (Viz Engine) that allows us to generate everything from simple lower thirds, to virtual graphics. We use the design software Viz Artist to create 3D elements. We typically manually check the virtual cameras in Viz Artist to display graphics from the desired angle. However, to view AR graphics, we let the virtual cameras be controlled by the movements of the tracker camera in the studio. This requires extensive calibration of camera position, lens and focus.

Real-time graphics

A challenge of AR graphics is that they must be generated in real-time. When we produce vignettes and other heavier graphics, it is not uncommon to spend hours or days to render seconds with graphics. This luxury we don't have when working with real-time graphics. We must deal with the CPU and GPU on the graphics machine to render in real time. This means among other things that we cannot use motion blur, global illumination, reflections, shadows and other effects to make the model as realistic as possible.

What did we design?

NRK introduced the new design package for NRK Sport in the beginning of this year's winter season. This design was mainly the graphics package that we developed for broadcasts from the World Cup studio. We based the graphics designed in Viz Artist on the light bands from NRK Sport.

These designs were used as the background for individual photos, schedule items, Instagram pictures, Twitter messages, head-to-head images and logos. We also made artificial reflections in the floor to sell the illusion that the graphics were actually in the room. We also made a wall to display video and medal statistics that was inspired by the Swedish Viasat virtual wall. In close collaboration with stage designer Audun Stjern, we got drawings of the World Cup studio and where we would place each virtual item. The elements were then recreated in 3D. Through a painstaking calibration process in Falun, these elements were 3D mapped against the real elements in the studio. Type color and lighting were fine tuned so that the 3D elements appeared as a seamless part of the stage design. We produced a virtual space behind the graphic wall. The idea being that the wall would open up and show a landscape that continued into the stage design. This is to create depth and parallax between the foreground and the background wall.

The opening shot

We wanted an entrance to the studio after the show opening animations and mood videos. To achieve this, we set up a system that seamlessly shifts from the camera animation in the opening animation, to the graphics system used for tracking camera movement. In the studio, we put up a camera on the wall that sent a video input to the graphics system. We could then play the video through opening graphics system.
When the opening approached the end, our graphics operator, Chris Nicolay Wernersen, could trigger a transition between the two cameras. The camera would then move backward and "expose" the video we had just seen, which was actually in a virtual environment. When the "World Cup studio in Falun" logo revealed, it was in the actual studio with Anne Rimmen and Thomas Alsgaard. Crane operator Jan Erik Finsæther started a movement with the real camera on the crane at the same speed as the transition between these two cameras and the result was a completely fluid transition. Here it was important to have good timing. Too early and quickly meant that the graphics would not sit perfectly calibrated to the wall. Too late meant that the motion would abruptly stop.

The Terrain model

We also constructed a 3D model of the terrain at Lugnet ski stadium in Falun where the events were held. We used this to display the trail profile for cross-country skiing and combined. We also added models of jumps in Falun. For the models to be useful, we were dependent on accurate models showing all the elevations in the area, including the infamous "Mørdarbakken."

It was difficult to obtain the elevation data we needed, known as DEM (digital elevation model) data, in a high enough resolution for the site in Falun. NRK has access to the elevation data for the entire world with a 30 meter grid spacing, and in Norway we have access to 5 meter elevation data from the Mapping Authority.

Measuring the elevation with 30 meter accuracy is too rough for such a small area. The Swedish mapping and land registration authority, Lantmäteriet, have laser scanned elevation data for all of Sweden with a resolution of 2 meters, but unfortunately this data is not freely available. We eventually found publicly available map data raster images with contours down to 5 feet for the area we wanted. This meant that we could create vector-based map data with contours of the Lugnet ski stadium. We converted this model to gray scale, where black is the lowest point on the map, and white is highest. This gave us a gray scale we could take into the 3D application CINEMA 4D and use as a displacement map. The 14 different slopes that were used during the championship were projected onto this model, animated, and exported as 3D object sequences from Viz Artist.

Experiences

NRK was one of the first broadcasters in the world to use complex AR graphics on TV during the 2006 Olympics in Turin. Since that time, NRK has been focused on virtual studios. This was one of the first attempts of using AR graphics since 2006. This pilot project by NRK has given us a wide range of experiences for both applications and technical solutions.

Crane photographer Jan Erik Finsæther says:

Working with AR graphics requires a closer cooperation between the crane operator and graphics. You have to have a dialogue about how you add graphics and go through trial and error to see how it works best. This is a new and fun way to work on overcoming challenges.

It is important to find the right application for this technology and identify the places where it can provide an added value to the production, both visually and informative. Sometimes a regular full screen graphic provides the same benefits as AR graphics. Finding the right combination of traditional lower-thirds, full screen graphics, displays in the studio, and AR graphics, is a balancing act we will continue to work for in future productions.

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ARCADIA "METAMORPHOSIS" AT GLASTONBURY

Arcadia's giant spider towering above the gently rolling hills and enchanted lay lines of Pilton in Somerset, UK, was arguably one of the most popular - and certainly most visible - landmarks at the 2015 Glastonbury Festival of Contemporary Performing Arts, now a world renowned event that accommodates 135,000 people and offers a wide variety of entertainment on about 50 live performance stages.

The spider – an awesome fusion of industrial art and innovation – is now one of the most recognisable creative elements of the four day 'Glasto' event and the Arcadia Spectacular has recently become a popular nucleus for the Glasto community's late night activity. Metamorphosis started at 11 p.m. and delivered 30 minutes of immersive 'shock & awe' in a jaw-dropping show uniting the cultures, spirit and visual audacity of underground rave and experimental theatre ... with some serious technological wizardry! This was followed by a sizzling hot DJ line up for the Friday, Saturday and Sunday of the event, transporting everyone into the next day in a force-field of positive energy, great vibes and a superlative visual and sonic experience.

This year the team at Arcadia Spectacular - led by the imaginative audacity of Pip Rush and Bertie Cole - produced a new show with special soundtrack, featuring three mini-spiders and a load of giant spider eggs, breath-taking aerial stunts, fabulous illuminated costumes, lighting, lasers, pyro and some extraordinary monstrous fire effects which thrilled and enthralled music fans as the three main evening shows started every night.

Also newly prominent for this year's show were the Lords of Lightening, three characters who unleash raw electrical charge into the atmosphere, and were brought into the main ring of action just outside the spider, instead of being on the periphery as in previous shows. This, together with the mini-spiders, was designed to make Arcadia Spectacular a truly 3D immersive experience and a fabulous geometric collage of live performance and technical disciplines at their most emotive.

With growing interest in staging the phenomenon internationally, the show's production has been tightened up on all fronts – from the performance itself to ensuring that the rigging and transportation of the spider – which now packs down neatly into three artics is practical, achievable and cost-effective.

Technical production manager Tim Smith came on-board full time in January 2015 to help move a number of these goals forward, including rationalising some of the technology involved and assisting in the development of a complex MIDI triggered bespoke show control system to run the entire performance. During Glastonbury, Tim co-ordinated a technical show crew of 55, including some of the best brains and creative minds in the business!

Lords of Tesla Coils

In a show so full of visual excitement, it's challenging to pick out individual moments to highlight, but the Lords of Lightening is something completely unique to Arcadia – three performers who stand on enormous tesla coils wearing special metal chain-mail suits, shooting massive bolts of electricity out of their hands into the sky ...

Arcadia's head of power and Tesla coils is Jeb Hawkins. These tesla coils were constructed in association with tesla guru Carlos van Camp who is based in New Zealand, and with whom Pip and Bernie first discussed the idea. The coils are around 2.5 metres high and emit between 2 – 3 million Volts! They each have two coils - a primary and a secondary. The charge that is in the primary is controlled by electronic switching – MIDI triggered from the show control system - producing a magnetic field which induces voltage in the secondary outer 'air wound' transformer (there's no physical matter between the two coils). The performers stand on the top of the coils in special chain-mail suits, effectively becoming an extension of the coil, allowing the charge to exit through the suit and up into the sky looking like lightening shooting out of their hands.

Work started on the Tesla machines back in January, as the show's soundtrack was being composed, which included the musical sounds to be made by the Teslas during the show. So making the coils actually look and sound right was a long and complex process. More challenges arose with developing a Tesla control system in such a large space, and in isolating all (other) things technical from the magnetic field they create! A hand-held controller receives a MIDI trigger (played on a sequencer) that sends the signal to the tesla controller. The MIDI signal is sent to a Cat5 transmission device that transports it across the field to the three tesla positions, firing the lightning bolts.

Building the main spider on site has now been honed down to 3 – 4 days. The body, head and three massive legs of the 12 metre high spider are an eclectic mix of scrapped military hardware and industrial machinery. The eyes – it has six, one pair on each of the three 'sides' - are a pair of jet engine housings, fitted with Clay Paky Alpha Beam 1500 moving lights which give it a remarkable amount of personality, from extremely scary to fluffy and benign, and a full range of expressions! The technical load in - lighting, sound, projections, lasers, pyro and fire – takes a further two days.

Projection & Video

The show's video elements are co-ordinated by Dave Whiteoak from Video Illusions who worked closely with Tom Wall from blinkinLAB who created bespoke footage and animations for "Metamorphosis" and ensured the backbone of the system ran smoothly. 'Video' combines mapped projections onto the spider's legs and LED panelling over the belly and DJ booth area, all stored on and fed from an Avolites AI server and triggered by timecode generated by the overall show control system.

Central Presentations Ltd (CPL) provided the six Panasonic 21K machines used to add texturing and movement to the legs, with a machine covering the front and back of each spider leg.

The projectors were rigged in weather-proof hides on six platforms placed around the Arcadia arena approximately 40 metres away from the spider structure, so they had a good throw distance. Much of the material was extremely subtle – if you can call a 12 metre tall spider ... 'subtle', but it added a proper depth and some crisp definition and that extra magical eye candy that Arcadia is all about - adding to the general craziness and fun!

Audio

Sound was designed by Audio Function from Bristol, with the main hangs comprising six arrays of L-Acoustics KARA speakers with SB218 subs, combined with inner hangs – on the legs - of six KIVA speakers plus the requisite subs to deliver a nice sensual low end right at the hub of the spider.

FOH engineer and system designer Matt Howes used SOUNDVISION 3D modelling to map the topography of the space in which the performance took place, and this formed the basis of his design, giving a perfect stereo image to which he added some little bits of his own magic to make it a perfect sonic environment.

Lighting

Imaginative lighting of the spider and the physical movement via its hydraulic claws plucking performers out of the crowd and incarcerating them in massive cocoons and eggs as part of the show narrative – is another essential ingredient that has been evolved by the 'Arcadia creative collective' over recent performances. For the last two years at Glastonbury, the main 'stage' lighting has been supplied as a dry hire by west London based Colour Sound Experiment, a leading UK rental company run by Haydn Cruickshank which has its spiritual roots in the underground rave scene of the 1990s.

For the 2015 Glastonbury show, they decided to have one brand of moving light and chose Robe. Four Robe Pointes were attached to the spider's three legs with another 10 units deployed on its belly, underneath the DJ booth and six Robe BMLF Spots were positioned on towers around the periphery of the space. They wanted lightweight fixtures on the spider itself, so Robe's Pointes were perfect.

Over 100 Dragon LED PARs were used to light various scenic and architectural elements of this incredible structure, with four Atomic strobes adorning each leg and three on the belly. All spider lighting was controlled via an Avo Sapphire touch console running in conjunction with the overall Arcadia show control system that dealt with hydraulics, winches, fire, pyro, lightening, etc. New lighting was added to the mini spiders which had to be super-lightweight and run off a single battery pack, so they sourced a variety of low-voltage automotive lightsources and adapted them. These were operated locally by the spider drivers.

Emphasising the dance, theatrical and cinematic aspects of the Arcadia Spectacular is a lot to ask of an expedient lighting rig, and the design is a constantly evolving 'work in progress' by the Arcadia creative and technical team.

Lasers

Lasers were supplied by Laser Hire London and co-designed by LHL and Arcadia to work specifically with the show choreography and the spider structure. Hardware included six 12 Watt RGB Kavant lasers on the lower positions, with two at the bottom of each leg, plus three 9 Watt RGB SwissLass lasers mounted below the walkway, all controlled from a Pangolin system running the new Beyond software using QM2000 interfaces.

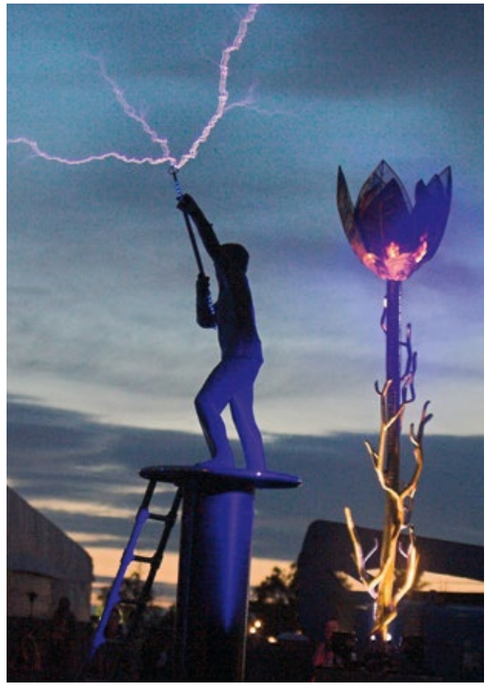
The lasers featured in specific segments of the timecoded show, working to safe sections for hot beams and laser fields to be projected over the audience and interact with the aerial stunts. During the "rave" following the actual show, the lasers were busked to get that organic, free-flowing effect, with the laser, lighting and video operators working in close harmony to give each element its own time to shine ... or altogether .. to create the sumptuous evocative big looks and full-on technical spectacular for which Arcadia is renowned.

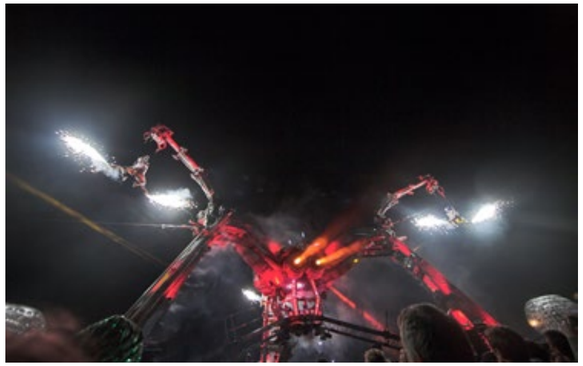
Pyro & Fire

Pyro was supplied by Event FX, again working closely with Tim and the rest of the team to develop a superlative looking show. This year, the addition of customised building boots worn by the performers enabled them to become human Catherine Wheels in the sky.

They also integrated the big "finale show" from 2014 into the end of the new Metamorphosis show, firing comets and gerbs through the structure cumulating with an impressive 275ft stage mine, trail comets and Arcadia's awesome fire wizardry and effects ... for an unforgettably BIG pyro 'photo' finish. The world's first bio-fuelled flame system was installed around the arena – also for the first time in an Arcadia show - at Glasto. This, combined with the shockwaves and heat from Henry Hots' flames on the structure, encased the entire arena with just under 30 individual flame heads. Six of these were on the spider, nine were on lamp posts around the arena and joined by the nine massive bio fuel flames!

You really had to be there to appreciate and experience the sheer excitement and raw energy of this show for real!





Show control

Arcadia has spent the past 2 years building a customised show control system tailored around the specific musical theatre nature of Arcadia's shows. The system outputs multiple control signals to Lighting, Video, Pyro, Flames, Lasers and Comms, from MIDI to timecode to recorded show calls and safety messages. As another 'glorious Glastonbury' came to a close in 2015 and the spider started being dismantled, the Arcadia creative and technical teams were already busy taking the latest elements of the Arcadia Spectacular learning curve on-board.

Planning the next "Metamorphosis" performance has already begun, and whilst it will always remain on the bleeding edge of the performance spectrum, the vibe is that we can expect to see a lot more of this truly adrenalizing all-encompassing live experience in the coming months.

Louise Stickland

Photo credits: Louise Stickland

ARCADIA
METAMORPHOSIS
THE NEW ARCADIA SPECTACULAR SHOW

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