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LIVE PRODUCTION

DIRECTORY 2017

The Business of Live Production

The Internet has Eaten the TV.

Television used to be an important medium. Sober, suit-wearing Congressmen used to lecture with a straight face about the 'critical value' of TV as a source of live news and information to proud, upstanding Congress attendees. In 2017 this is simply ridiculous. The Internet (not TV) is now the essential utility for more and more people around the world. They rely on it daily, in many cases both professionally and personally. The Internet (not TV) will drive the second Golden Age of entertainment. According to Parks Associations in the US only, more than 15 million households are not reachable via traditional cable or satellite TV. And this number is still higher in other regions, such as Latin America, Europe, Asia and Africa. This is just one of the reasons why the number of potential Over-The-Top (OTT) new subscribers between 18 and 40 years old is estimated to reach 332.2 million globally by 2019 (reaching 18 billion dollars in revenue by then – meaning an increase of 800% from 2011). If you accept that the future of TV is an app, everyday users will be more willing to pay for exclusive content, especially if live video is into the proposition and available on any device, any time and everywhere. Reaching new users via all the possible devices is not a threat but a clear opportunity: building official applications for AppleTV, Roku, connected TVs, PS4, Xbox, Amazon Fire TV and others will allow sport rights holders to offer users the best video experience, reaching growing audiences, and consequently impacting very positively into the first line of their P&L.

OB Fleet is Growing Worldwide

With this in mind we had a closer look to new HD/UHD OB trucks and are happy to present 25 trucks in quite detail (page 58 – page 149). The presentations include trucks from Arena TV, EuroMedia, Express, Fuji Media Tech, Gearhouse Broadcast, GH ONE, HD Resources, Hessischer Rundfunk, Levira, Mobile TV Group, NEP Australia, NEP Norway, NEP Switzerland, NEP USA, NVP, Point2Point, RTM, SBS, Televizia Markiza, Timeline\TV, Turkmenistan and TV Globo. In addition, we cover stories on the future of the OB Truck (page 6), on some learnings of building 4K trucks (page 15), the first 4K truck in Sri Lanka (page 34) and a SNG for ORF incorporating internet, video/radio production and IP streaming (page 42).

High-End Sport Productions

The America's Cup sailing race is the oldest trophy in international sport, dating back to 1851. And for the 35th edition, presented by Louis Vuitton, the location was Bermuda, as the event moved to the iconic Great Sound (page 18). Baseball games are usually celebrated as big events for the entire family and great happenings (page 21). The same is true for Tennis where Perform serves the WTA with a fresh approach (page 24). The story about new frontiers of sports tracking is focusing on player tracking in the Bundesliga and the Premier League (page 27). Away from the field of play, a ground breaking technical solution is helping pave the way for a new sports broadcast model: The Belgium Proximus League & Cloud Production (page 38). Over the course of nine days tpc followed the cyclists of the Tour de Suisse winding their way across the whole of Switzerland, cross two national borders, climbing mountains up to 2,400 meters and test their strength in beautiful valleys (page 45). We also were following the 150 cars on their 24h race in the "Green Hell" of the Nürburgring (page 48). Together with TV Skyline we followed The FIFA Confederations Cup in Russia (page 54). Finally, we watched the Edmonton Oilers in Rogers Place Arena (page 189) and looked forward to the Winter Olympics in Pyeon-Chang with AMPVISUAL and the production of the Biathlon World Cup in South Korea (page 192).

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LIVE PRODUCTION

High-End Show Productions

A 50-tonne mechanical spider spewing fire, electricity and laser beams might sound like an arachnophobe's worst nightmare, but the Arcadia Spider is leaving audiences around the world breathless as part of a spectacular immersive multi-media show (page152). For the 12th consecutive year, communications and signal distribution solutions from Riedel played a starring role in the Eurovision Song Contest, the world's longest-running international television song competition (page 168). We joined Bruno Mars on his 24K magic world tour (page 172) and we had a detailed look to an unusual Musical in Germany: Luther's Theses (page 174), we followed Ed Sheeran around the world (page 178), and visited the world's first UHD broadcast of a major music festival: The Isle of Wight Festival (page 180).

Enjoy

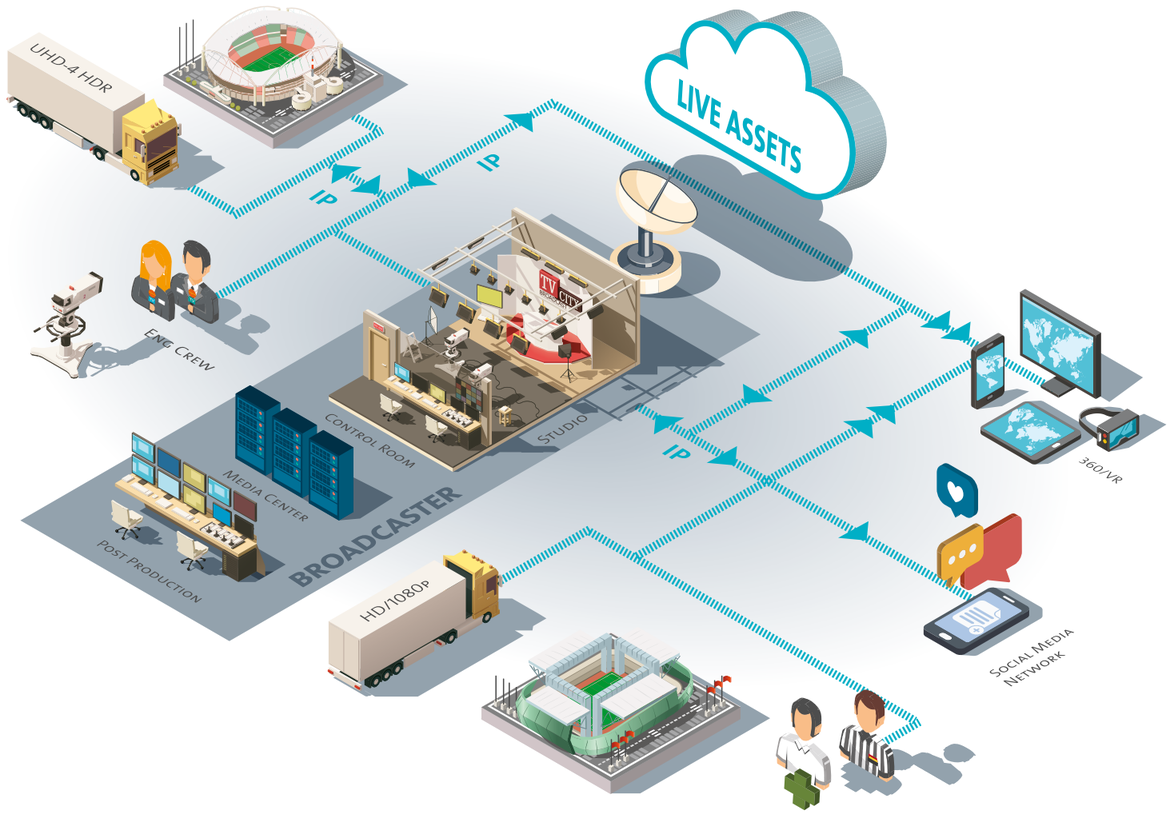
CONTENTS

LIVE
Reports
EVENTS

Reports

Portraits OB Trucks

LIVE
OB Trucks
TECHNICAL SYNOPSIS



WHERE WILL THEY PARK ? THE FUTURE OF THE OB TRUCK

Live production isn't static – it never has been. Workflows and the processes they enable are constantly evolving. With the introduction of UHD-4K, the adoption of IP for the deployment of infrastructures and the roll out of workflows that support new, more immersive consumer-facing formats, outside broadcast facilities are facing more challenges than ever before.

A changing consumption model

Previously, every separate facility and the technology within it – whether in an OB truck, a studio or broadcast center – had been largely defined by the boundaries of SDI, with a role that started and ended at a very finite point. Camera feeds would be ingested into a truck. Operators would create replays and a director cut together a live program. It would then be given to regional broadcast partners who would deliver it to their audiences at home. But as technology has evolved, more has become possible.

Audiences want more content, on several platforms, any time, any place. The internet has created this demand as OTT, IPTV and social media have moved from being secondary or tertiary ways of consuming content to a primary one. Several years ago, a better TV experience meant a bigger TV on the wall. Now, every platform needs to be joined up, delivering one experience to viewers using multiple points of entry. Televisions, computers, smartphones and tablets are all now just as important as each other – screen size is less significant. Experience is everything.

New production processes

To support this, content production can no longer have just one start point and one end point. More and more, onsite cameras capture as much as possible and add it all into a central hub of live assets. This large reserve of content should be accessible to multiple broadcast partners to dip in, take content as needed and deliver it to users in the best way. Host broadcasters no longer create a single stream of content for regional distributors to transmit to users.

This content hub is only going to grow to allow the production of tomorrow's biggest live events, enabled by the evolution of technology and improvement of connectivity. And OB trucks will remain on the front line of those events to enable this. But with more connectivity-focused tools, allowing stakeholders to access content no matter where they are, or where it is, collaboration will become the most important element in a content owner's arsenal inside a mobile production unit.

Remote production – death of the OB truck?

OB trucks will remain an integral part of any overall production process. Even as remote productions become even more of the norm and a number of programs will be directed from a broadcast center on the other side of the world. And the roles of onsite engineers and project managers will change in order to better serve a new, evolved set of functions from the field.

However, this is an opportunity to further enhance the programs that are delivered to consumers. The introduction of new technologies will create converged networks for live production, enhancing file exchange, content control and interactivity of assets.

With roles executed from different sites and in different ways, personnel on location are freed up to produce more content and better storytelling. This means the mobile unit will become less of a workhorse of boxes and racks, and much more of a creatively-minded facility where engineers can focus on the enhancement of live coverage through new ways of presenting live programming.

New formats need new facilities

Since consuming IP-delivered video is now second nature to many viewers, content producers are turning their heads to the next step in creating an immersive live experience. 360-degree video and virtual reality content is increasingly becoming more popular and the technical facilities that produce this content will make their home inside OB facilities.

Facility designers can take advantage of the space that's saved by any remote working that takes equipment out of the OB truck. Units will become test beds for new technology deployed in the field. Using this space means more cameras with advanced functionality can be utilized – opening the way for the production of more immersive formats like VR and 360-degree content.

A new kind of broadcaster

How content is delivered will also have an effect on how outside production units are used. Broadcast partners are no longer just the traditional broadcasters – and their diversity will only continue. Last year saw Twitter deliver NFL games – this year it's Amazon. Football is being delivered via Facebook Live and YouTube is now a major player in live and on demand broadcast content delivery.

OB trucks need to be able to facilitate content for all of these platforms at once. The square video preferred by social networks isn't going away – our smartphones and mobile devices will continue to dictate how we consume programming, so anything we watch needs to be compatible with them as much as it is with the 50-inch, 16:9 television mounted on the wall at home.

Increasingly we'll see OB trucks creating content for these platforms from the source rather than deploying time-consuming post-production processes to make sure they're compatible. Production tools can now use artificial intelligence to dynamically identify the most interesting part of the video and automate the task of cropping and delivering the right aspect ratio while also outputting the standard broadcast sized image.

Resources of mobile trucks will be redirected from the technical roles no longer needed on site to something more of a content manager, making sure social, OTT and IPTV-native content is being produced in the right way for the right platform.

The technology enabler

One of the big enablers of these advancements is of course IP. Its implementation in multiple live workflows and trials at major events have shown some of the true benefits of this technology. And there's no single, best way of implementing IP technology. There are IP-enhanced SDI products available as well as entirely IP-connected solutions and a number of propositions that talk about replacing any SDI hardware with completely software-based offerings.

The industry is in a state of transition where the adoption of IP in new infrastructures is now common place. And it's in the transition, and not the sudden switch to IP, where its real benefits will be seen.

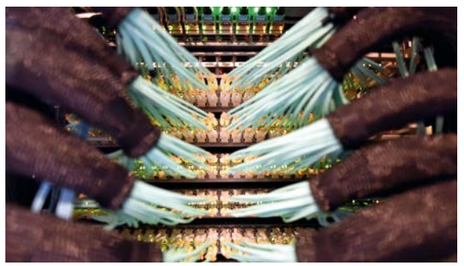
Facilities providers can invest in technology that is SDI-based and operates in a 'traditional' environment, but also be ready for inclusion in IP infrastructures when ready.

If a broadcaster prefers to produce a tennis match using a completely traditional SDI-only OB truck then that's what they should send out on location. Similarly, facility providers will continue to push and build IP-exclusive facilities, which take advantage of remote production and this should be encouraged.

There seems to have been a shift in the industry of certain facilities providers, technology vendors or those who'd call themselves 'disruptors', pointing the finger to say 'this is the wrong way to produce your content.'

However, each game and concert is different. The production of these events presents an important number of unique requirements that users, technology vendors and facilities providers come together to address with whatever solution is needed. Technology will fuel the next generation of live programs, but content producers still need to demonstrate a good business case for the facilities they deploy – balancing state of the art technology with the end result.

New technology should be adopted in the right circumstances – content producers shouldn't feel pressured to install a complete IP solution halfway through a production schedule if their SDI-based workflow does a good job. New technologies should be focused on creating easier to operate, more efficient production processes.



The opportunity of virtualization

In delivering IP-enabled workflows, new opportunities will occur. Remote production is one – virtualization is another. With the right infrastructure in place, virtualized or software-defined technology can deliver the most flexible of production facilities. Moving certain functions away from hardware and into the cloud will mean facility providers will spin up or down services as needed.

For instance, an OB truck may be deployed to serve a standard production, but on individual days a peak is needed in performance for a different event. In this case, an OB truck with virtualized facilities will spin up additional resources, such as extra ingest or playback channels and more browsing tools for content access. This type of flexibility will allow them to better address the dynamic needs of a client's demands.

So what will happen to the OB truck?

No matter the new technology or latest advances in production processes, none should be considered if they don't produce the best possible live programming for consumers.

Whether it's created using a traditional OB truck or a revolutionary production technique, consumers frankly don't care. But they do have expectations that however they consume content, it must be delivered to them in the most engaging way, at the highest quality possible.

This will be done through production facilities that are flexible and can bend to any production requirements – whether it's the size of deployment or a technically more advanced setup. Facilities also need to be future-ready. Even if complete IP adoption isn't an option – using the technology to better connect your production processes and deliver more efficient workflows will create key benefits to content producers.

So where is the OB truck going? Nowhere. It will simply evolve to create better, more immersive experiences for audiences.

Fair play for everyone with slomo.tv videoReferee® system!

A decade ago, Slomo.tv, a leading international supplier of cost-effective, high performance server-based video recording and replay systems introduced its first 4-channel sports video judging system, videoReferee®, at the 2007 World Hockey Championship in Moscow. Working closely with Vladimir Mironov, the chief engineer of Moscow Krylatskoye Ice Arenas, slomo.tv developed the concept of a modern video judging system for ice hockey. Since then, several generations of slomo.tv videoReferee systems have been installed in more than fifty arenas throughout the world.

More than just goal confirmation

Listening to the requirements of the Ice Hockey referees, who wanted to keep track of not only goal-line incidents, but also a range of situations such as icing, offside and fouls the company in close cooperation with Continental Hockey League (KHL) added recording of panoramic cameras. It turned out that when a panoramic camera records in standard definition the puck becomes invisible. At resolutions of 720 pixels across a 60m rink, the 8 cm puck accounts for just one pixel of the image. Therefore, it became necessary to add an HD SDI video input for Full HD panoramic camera. Another key innovation introduced by slomo.tv into its systems was interface with scoreboard match controllers. The game information (Time, Score, Penalty Time, etc.) received from scoreboard computer via a special interface is always synchronized with recorded video of all channels. Having full synchronization of video cameras with the scoreboard is very important because, in accordance with the rules, only goals before the time has been stopped are counted. Currently, videoReferee® supports several dozen types of scoreboard controllers.

Multi-channel action recording – hockey evolves into soccer

Back in 2011, developing the VR-IIM2 model, slomo.tv engineers determined that for controlling situations over entire playing field, the server should be able to record up to 11 channels. And forward-thinking hockey clubs that selected 11-channel videoReferee®-IIM2 have been rewarded by recent changes in KHL regulations. These clubs did not have to change or upgrade their servers – they could remotely upgrade the server software and its settings and very easily install two additional cameras. Over recent years, the concept of the video refereeing has gained appeal in many sports and today it is a hot topic at the world's most popular sport – soccer. In July 2012, the International Football Association Board voted unanimously to amend the Laws of the Game to permit (but not require) goal-line technology. The technology was used at the 2014 FIFA World Cup. In April 2016, the Italian league, Serie A, was selected by the IFAB to test video replays for the 2016–17 season.

In May 2016 slomo.tv's 12 channel videoReferee® system was demonstrated by Broadcast Solutions GmbH at the FIFA workshop in Amsterdam, resulting of its acceptance by FIFA. In September 2016, the Video Assistant Referee (VAR) systems, were first used in an international friendly between Italy and France for testing, with plans for implementation at the 2018 FIFA World Cup. Video refereeing in football, unlike cricket or tennis does not allow appeals from participants. Instead, match footage is constantly reviewed by a VAR, who alerts the on-field officials if they feel a reviewable error has been made.

Only the referee can initiate a review, either on the VAR's recommendation, or if he feels a mistake has been made.

videoReferee-V – advanced features make stunning images

Slomo.tv is now testing the videoReferee®-V, the latest generation of its judging systems at football stadia in Russia where 2018 FIFA World Cup will take place next year. The new system pushes back the boundaries and creates a new standard in multi-channel video referring since it can record up to 24 HD/3G channels. This means that now, any competition can be "covered" by one server.

To display so many channels requires monitors with more than 1920x1080 resolution. Now these screens can have resolution of up to 4K, which provide detailed images of all 24 channels. Since the system can work with 3G signals, when investigating disputed incidents, the images are twice as sharp as they are when working with HD signals. Another noticeable feature of this system is its ability to work with 720p, HD and 3G signals on a single project.

VideoReferee®-V also has an SDI output option for providing, if necessary, the output from the referee's monitor to broadcasters. The system records 24 cameras. The referees can analyze incidents frame by frame concurrently from several camera angles. The video image can also be zoomed in to scrutinize the action in the finest detail. Events can be marked live or on recorded video and they are instantly available for review. When an event is created, the system remembers the currently active channel, and when returning to this event, it starts with the same view. Marked events are also used to create video reports with highlights of the game's most controversial moments.

Using the vR-Keypad, the operator or assistant can assign with a single click different event tags. The system's search engine enables the operator to instantly find tagged events. The standard videoReferee®-V configuration includes two monitors – engineering interface monitor with built-in multiviewer of all channels and folder of marked events and referee's monitor with controller for the video judge. The video judge can work with 1, 2, 3 or 4 cameras simultaneously in live or search mode. That helps in accurate and quick decision making. Users are able to create different presets of channels. The system can also magnify any frame for detailed analysis. Besides the referee's and engineering monitors, videoReferee®-V can accommodate a third monitor working as a separate multiviewer. This is useful for a video-assistant who can mark events on live video when the referee's monitor is used for analyzing in-play incidents. In the case of limited space and/or personnel, all these three interfaces can be displayed on a single monitor using the system's MultiSkin function.

All these new capabilities and features make the new system a champion in sports video judging. "However, we are not stopping here" - said Igor Vitiorets , the CTO of slomo.tv. "Yes, soccer is our priority today, just as Ice Hockey was a few years ago, but we are also successful in other sports, such as Handball, Basketball and Canoe Slalom. "Our system videoReferee®-IIM3 was used for judging the Canoe competitions at the Olympic Games 2016 in Rio. We are constantly learning from our partners and customer," added Igor Vitiorets.

France's IHF Handball World Championship

Recently VideoReferee® was used as the main video judging system during the IHF 2017 Handball World Championships in France. The organizers added this important facility following requests from its video judges. During most competitions where video-assisted judging is used the system is usually connected to the arena scoreboard controller for receiving the relevant data (time, period, score, etc.). Quite often there are situations when, for some reason, such direct connection cannot be established but it is critical for synchronizing scoreboard timing and video. A typical example is judging the validity of a throw in basketball at the end-of-shot clock. Only if the throw was made before the end of this time-slot is it valid. In order to deal with such situations a new feature, displaying a selected portion of the scoreboard as a PIP during search and playback was added to the system. At system setup the operator will select the scoreboard area to be displayed. During playback/search of any channel this part of the scoreboard will be displayed in the corner of the screen.

For systems with a limited number of channels (videoReferee -B, -Jr. or -SR) there is a special Scoreboard Camera Option, providing an additional external input channel via the USB interface. Any camera with SDI or HDMI output or even consumer camcorders can be used to capture the scoreboard. "Technology of video refereeing as is still evolving," concluded Igor Vitiorets. "And we are proud to have been at the very roots of it. But it is not just the technology or importance of sales: we are passionate about "fair play" in sports and want everyone to have this opportunity. That is why we are looking at rental and leasing business models offering affordable videoReferee® solutions to all our potential customers, no matter how big or small they are. According to IABM research, today the service/rental business model overtakes system sales and we can learn from this. Expect more news on this subject at IBC2017."

TVC AND CROATEL TO 4K

Systems integrator and coachbuilder TVC and outside broadcast production company Croatel continue their long lasting and successful relationship. Last year both companies embarked to build the UHD 4K OB van. This was the first 4K endeavour for both companies with numerous challenges and tough technical decisions along the way. Croatel OB5 UHD 4K has been in operations for a year already and lessons learned can now be shared with the broadcast audience.

The main goal of building the UHD 4K OB van was to achieve the best possible UHD picture quality available at that time. While increasing the number of pixels from HD to UHD is already a significant step forward, it was clear that the defining factor for an improved image would be the high dynamic range (HDR) technology. HDR improves the pixel itself providing the depth of colour, contrast and clarity to the picture which surpasses by far the previous viewing experience. This is what the broadcast technology innovations are about in the first place – the viewers' experience.

At the start of the project in early 2016 there was only a limited choice of vendors offering cameras with the HDR technology already implemented and not on the roadmap only. At that time Sony was the leader in the technology and Sony HDC-4300 cameras was a natural choice. The camera is all in-one for live sports production which is at the core of Croatel's business. The truck is equipped with fourteen of these cameras and wired for sixteen. In addition to the cameras, Sony's flagship XVS-8000 vision mixer was integrated to compliment the camera system. Crucially, it allows to mix live UHD 4K and HD pictures in parallel production. What is more, this video mixer enables IP live production via Networked Media Interface (NMI), an interface supported by a number of industry vendors' looking into the future of IP. In order to compliment production an additional 2 M/E Sony mixer panel was integrated for an independent program production utilizing the same core processing. Overall, the OB van has 4 M/E for UHD 4K production.

The 4-wire 4K technology was chosen for system interconnections and this choice was mainly dictated by the camera system selected. Though cumbersome this technology is by far the most robust, economical and provides necessary bandwidth for production with uncompressed images. The wiring of OB van of this size even in HD technology may already be of extensively large scope. For the 4-wire 4K multiply the scope by four, which is an immense work for an integrator. As an example, patching sixteen cameras alone occupies two standard 2x32 patch panels. An agreement on common IP standard for improving interconnections of 4K production is crucial in the future in order to make the UHD 4K a viable production format.

At the centre of all interconnections sits the Evertz EQX Series 288 x 576 (3G-HD) flagship video router. It is one of the most flexible video routers in the industry, providing multiple signal processing capabilities within the router itself. In our case it is equipped with 32 embedders (3G-HD) and 36 deembedders/Frame sync cards, which helped save significantly on implementation costs. Most importantly, Evertz router provides necessary interoperability interfaces for other system components. Both Sony and Evertz support the development of NMI interface. The router and switcher are connected via NMI providing the future proof interface to bridge video over IP connections immediately when necessary and without any hassle. In addition, intercon-

nection of all audio connections between router and Studer Vista V audio mixer were simplified by A-link interface, which is developed by Studer and supported by Evertz.
Production monitoring in Croatel OB5 is performed as a combination of 4K and HD. Evertz router is equipped with 4K multiviewer outputs, which are fed to 6x Sony Pro Bravia displays in the production area and converted to HDMI 2.0 with AJA's Hi-5 4K mini-converters at the monitor side. The same is provided to the secondary production position in the engineering area for 2x Sony Pro Bravia displays. 4K monitoring is now widely utilized even in HD environments, providing producers with much sharper images and greatly improved working conditions. In order to simplify installation and cost vision control is performed in HD with Sony's PVMA 17-inch OLED monitors at each camera control position and in 4K with a single Sony's flagship BVM X300 30" 4K OLED master monitor overseeing all camera control positions with 4K signals fed from the router.
A critical component of the UHD 4K system design is system management. The OB van needs to be often reconfigured for different venues and production requirements. An additional component is provided for set-up configurations from HD to 4K and vice versa. This is where Lawo's virtual studio manager VSM does its magic. It enhances flexibility and set-up time of any system, but it is especially advantageous when it comes to reconfiguring all system components from one video format to another for various production requirements and venues. It was obvious from the start of the project that a specialized management system taking care of this aspect will be necessary to make system configuration a bliss and not a burden. If before it was a nice-to-have system component, it is now a must-to-have in order to make a 4K OB van a viable investment. Mechanically OB5 was developed as an overall system component from the very start. Critical mechanical dimensions and solutions were based on the use of particular equipment. An expanding monitor wall was dimensioned to accommodate 3x 49-inch Sony monitors in the row. Make a mistake and you will be left with insufficient space. In order to provide large and easily accessible rack capacity which is mostly occupied by large number of EVS servers required for sports production TVC developed additional air conditioned and noise isolated rack space below vision control positions. Dedicated racks were foreseen for rack unit hungry Studer Vista V console in the audio production room. In additional, TVC designed and constructed rack doors for quick access to and easy removal of equipment, which is an important feature for production companies changing equipment from one van to the other on a frequent basis.

Overall, mechanically UHD OB5 is similar to HD OB3, the first OB van that TVC made for Croatel back in 2013. It is a 12 meter long OB van built on Volvo FM chassis and equipped with two expanding sides. The introduction of the second smaller expanding side for production monitor wall was significant change and necessary improvement. It provides a larger distance to the monitor wall providing improved overview of all video sources while 4K monitors and picture provides sharper source images. All this combined significantly improves working conditions for producer and production team. The layout developed in partnership with Croatel for OB3 has become a trademark of and bestseller for TVC. Since 2013 seven OB vans were produced by TVC utilizing this design. It proved to be a simple, attractive and ergonomic environment for the most demanding top-class sports production.

Building the UHD 4K OB van required top class engineering skills, team effort and project management. At that time TVC and Croatel engineers worked to develop system solution utilizing components that were so fresh that they were not even officially available on vendors' sites. Testing and troubleshooting was a key part of system implementation more than ever. Ensuring proper communication between all stakeholders was critical to complete the system integration and meet the set deadline and budget. From start to finish developing Croatel OB5 4K was not simply another project, it was a challenge that was enjoyed by everyone involved, because it was both a technical and creative effort. Looking at the current developments in the 4K environment it is clear that these skills will be important for quite some time in the future while the broadcast industry establishes common standards for 4K production.

About TVC
TVC is a specialist in outside broadcast, coachbuilding and TV studio integration services. Also providing complete installations for digital cinema, sports, entertainment arenas and radio broadcast stations. TVC designs and implements various broadcast solutions in Europe, Asia and Africa. TVC clients are commercial organizations, private and government-owned TV and radio broadcasters, government institutions and enterprises. Close contacts with leading TV equipment producers ensure smooth integration of complex IT control and processing systems. For more than 20 years, TVC engineers have implemented more than several hundreds of projects of various complexity and size.

More information at www.tvc.tv

About Croatel
CROATEL offers services for the professional outside broadcast and satellite communication, company has been active on the market for over 20 years and currently has 66 employees. CROATEL owns five (5) HD OB vans for HD production of UEFA Champions League and Europa Football League and is also responsible for realization of all Croatian Football League games. CROATEL's main business activity is HDTV production, as well as ownership, realization and 24/7 service of HDTV playout system (facility) that broadcasts 6 HD sport channels on the territory of Croatia.

More information at www.croatel.hr

BroaMan Provides 35km Fibre Transmission for America's Cup

Bermuda Broadcasting meet all challenges with major technology upgrade

The America's Cup sailing race is the oldest trophy in international sport, dating back to 1851. And for the 35th edition, presented by Louis Vuitton, the location was Bermuda, as the event moved to the iconic Great Sound.

Local Bermuda Broadcasting Company (BBC) were appointed as the official broadcast partner, and they responded by creating an advanced fibre network between the America's Cup Village at the Royal Naval Dockyard, the transmission, editing and news gathering hub, and their own studio back at base. They did this via a BroaMan advanced fiber network ¬— this has not only enabled them to provide viewers and listeners with live coverage of all the racing over the five weeks via terrestrial TV and radio broadcasts over IP but also to feed its web and social media platforms. This has included taking video and commentaries out on the water, from helicopters overhead and on shore.

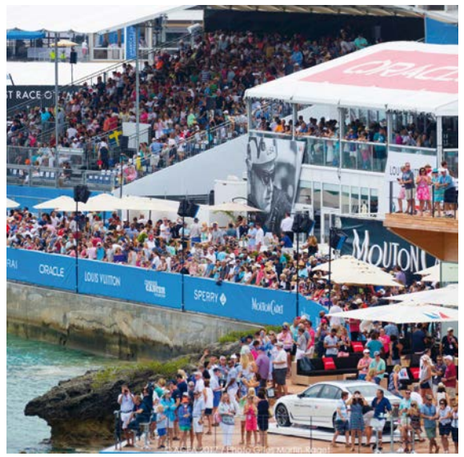
BBC constructed this by deploying a powerful pair of BroaMan Mux22 interfaces which connect the 35km distance between the two locations via a single duplex fibre. These hardware enablers allow them to provide connectivity of six video signals (4 HD-SDI In / 2-Out), 4 Line In / 4 Line Out, 4 GPIO (with IC444 board) plus a 100Mbit LAN switch, RS485 and 1Gb Ethernet.

Patrick Singleton, CEO of Bermuda Broadcasting, admits his company's appointment by the America's Cup organisers had forced a substantial upgrade at the station, including new TV and radio transmitters, high-speed fibre-optic systems and a fully digital workflow. "The America's Cup is the greatest sporting event in Bermuda's history, and we are pleased to have been able to present this in beautiful, high definition."

But this looked unlikely when last year a lightning strike damaged their playout and destroyed sensitive MCR automation equipment ahead of the Summer Olympics. Having competed in three Olympic Games himself, and now on the International Olympic Committee's Athletes' Commission, he was quick to act. "We handle a lot of live sports and so we developed a mobile application to show this important sporting event, but that didn't solve the problem of terrestrial broadcasting," he explained. It showed just how far BBC had come since setting up 70 years ago, initially broadcasting AM radio before branching out into FM and terrestrial TV. When seeking the optimum solution for the America's Cup coverage Singleton became aware of the BroaMan platform, and its vast potential, after reading an interview with their MD, Tine Helmle on SVG Group's online resource. In it she discussed fibre solutions for professional broadcast. "Especially interesting for us was the fact that BroaMan had supplied a solution for the World Rowing Championships and I could see they were especially good at delivering sporting events. I wanted to create a remote broadcast facility at one end of our country and operate from a master control back at base ... and BroaMan seemed like the perfect solution," he stated. He then spoke to Helmle at length, researched the brand and met BroaMan representatives at the NAB Show. It had been the innovative app they had created after the lightning strike that had first aroused the interest of the American Cup organisers, and they had initially asked BBC to assist with their own app.

"This was the catalyst," remembers Patrick Singleton, "but instead of building a mobile app we were then asked if we would handle their entire terrestrial broadcast feed so that the entire country could watch or listen to the races live on TV or Radio ¬—Including all the spectators watching and listening live from boats on the side of the race course."

In fact BBC had been looking at a level of implementation beneath BroaMan's Mux22, which combines different formats of video and data in a single fibre cable. They felt BroaMan's Repeat48 would have sufficed. "But then the organisers told us it was no longer just TV they required, but radio as well, and they wanted a physical presence in the



America's Cup Village, with DJs and live news," Singleton remembers. "And so the requirement changed. We needed to move to Mux22 as we were taking a large number of feeds direct from the America's Cup OB's routed through the BroaMan platform."

In fact the amount of data and number of UHF channels being transmitted was remarkable, with the HD-SDI signal entering the BroaMan domain and coming out over fibre to BBC's main studios. "We have a 12km line of site but there is a fall over redundant fiber ring that runs 35km that we had to plan for," Singleton continued. "Once the signals arrived at our station we play them out over our TV and FM transmitters."
They also send the signals to local cable companies and their live produced TV race feed is also sent 14,000km by fibre to Asia where it's recorded and stored. "Additionally the event organizers asked us if we could pass through our equipment a special broadcast feed that they were producing to one of the cable companies for delivery to Super Yachts. This was made possible due to the flexibility of the BroaMan Mux22."
He emphasized the value of BroaMan with the following anecdote: "In one instance we were doing some editing at the event village and had a 3Gb file and we thought it would take an age to send it back to base but it went in seconds. With BroaMan, large files can be sent very quickly and it went straight into our network storage. "We were confident in the BroaMan technology and it has proved to be rock solid — it was German engineered so it had to be good."
The 'rock solid' fibre network was co-designed with UK-based consultant engineer Mark Johnson from TTFN TV, with the aid of their new transmitters. An earlier concept of a wireless and microwave technology solution was dismissed due to interference and the threat of large ship masts cutting the point to point link.

It had been Johnson's idea to use an Ethernet Audio over IP network, using the 100 Mbit LAN and 1Gb switcher for file transfer and remote control. "The Telos Axia Live-Wire provided the AoIP sub-network, linking video to the NewTek IP Series Video Mix Engine," he explained.
Further expansion of BBC's remote mobile facility included the acquisition of a LiveU LU500 video field unit for OB transmission, while the purchase of IP switchers has been a further benefit in the broadcasters' systematic upgrade.

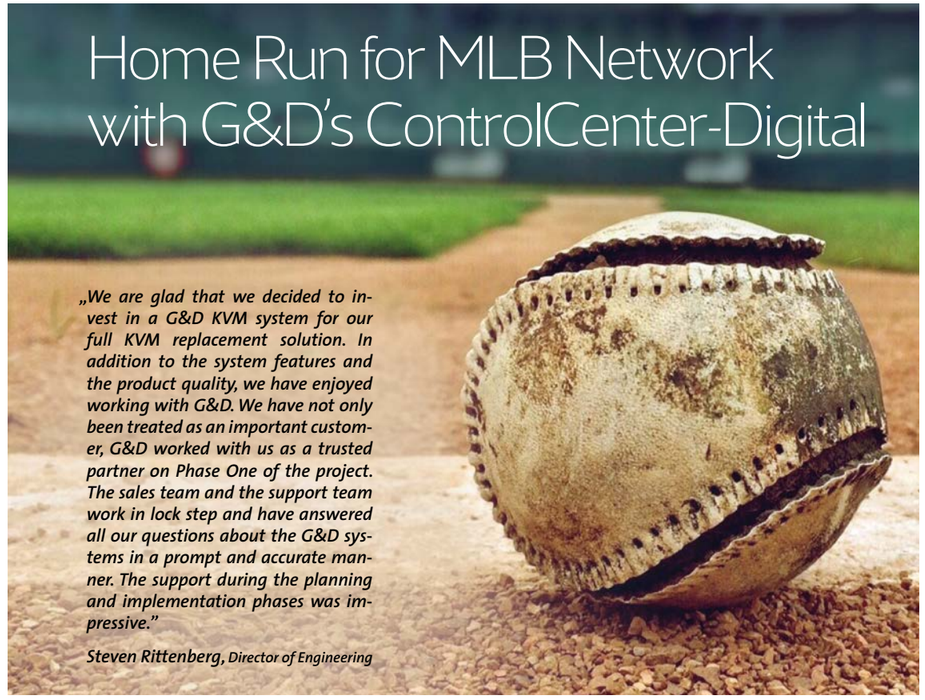
Reflecting on other challenges, Patrick Singleton continued, "The SFP transceiver modules also had to be right, which was difficult. In fact the organisers tasked us with a lot more than we had initially expected." This included IP cameras for security and monitoring the America's Cup pit lane. "It's been fantastic operating all this through the BroaMan gear," he said. Meanwhile, feeds to guest broadcasters from around the world, including NBC, BT Sport, Sky Sports, Canal+, Mediaset, RTVE, Eurovision were provided by the America's Cup authorities themselves.
This exercise has marked a major technological step change for Bermuda Broadcasting Company. "Five weeks is a long deployment and the BroaMan portable rack has been faultless — particularly considering we are operating in a tent that wasn't air conditioned rather than a dedicated post production facility. In fact we have been so impressed with it that we now feel the need to continue with it." But at the same time he emphasizes the necessity to access dedicated dark fibre in order to provide coverage, for instance, at dedicated cricket or football venues.

"We have been able to broadcast practically frame accurate, and our people are in awe of it. We've really shown how a legacy media company can up its game."

As for Mark Johnson, he was also unequivocal about the role played by BroaMan in the success of this year's America's Cup. "Their fibre solution has just fixed so many problems, it was like the genie out the bottle," he said. "As hardware enabling components, BroaMan provided the equipment in one neat box at each end — enabling us to do everything we wanted whereas previously it would have required half a dozen. It was such a neat solution."

Photos America's Cup © ACEA 2017 / Gilles Martin-Raget

Home Run for MLB Network with G&D's ControlCenter-Digital



„We are glad that we decided to invest in a G&D KVM system for our full KVM replacement solution. In addition to the system features and the product quality, we have enjoyed working with G&D. We have not only been treated as an important customer, G&D worked with us as a trusted partner on Phase One of the project. The sales team and the support team work in lock step and have answered all our questions about the G&D systems in a prompt and accurate manner. The support during the planning and implementation phases was impressive."

Steven Rittenberg, Director of Engineering

MLB Network, the 24/7 cable TV network dedicated to baseball, is operating two G&D matrix systems in its headquarters in Secaucus, New Jersey. The Control Center-Digital frames have a size of up to 288 (CCD 288) and up to 160 (CCD160) dynamic ports. MLB Network replaced parts of its older analog KVM system with G&D's ControlCenter-Digital, delivering added flexibility due to an increase in ports coupled with G&D's dynamic port system. In 2017, MLB Network will complete a facility-wide KVM conversion to G&D. MLB Network now has the option to configure its individual KVM workplaces with either cascading or a bi-directional connection of the CCD systems allowing easy expansion of its KVM infrastructure. Important criteria for MLB Network's new KVM system included general product quality, the option for expansion, low latency, fast switching speed, and high video quality. G&D offers high-end KVM systems that fulfill all of these requirements and specifications. MLB Network is now working with a mix of DP, DVI and VGA servers connected to the Control Center Digital matrix frames. The CPU units have either individual power supplies or are connected to a central power supply unit (MultiPower-12 for up to 12 x G&D CPU module).
On the operator side, MLB Network decided to make use of mainly DVI and DP operator units (DVI-CON and DP-CON).

Overview

Customer
MLB Network is the ultimate television destination for baseball fans, featuring the multiple Emmy Award-winning MLB Tonight, live regular season and Postseason game telecasts, original programming, highlights, and insights and analysis from the best in the business. MLB Network debuted in 50 million homes, is currently distributed in approximately 68 million homes throughout the U.S., Canada and Puerto Rico, and is available for live, authenticated streaming via MLB.com AT Bat and MLBNetwork.com. For more information and to find MLB Network in your area, go to www.MLBNetwork.com.

Challenges
Expanding IT environment
Separation of equipment and staff
Access to hardware in different locations

Products

KVM matrix & peripherals:
1x ControlCenter-Digital 288
1x ControlCenter-Digital 160,
DP-HR-DH-CPU & CON modules,
DVI-CON & DVI-CPU, VGA-CPU-UC
KVM extenders:
DVI-Vision-CAT-AR-CPU & CON
KVM accessories:
Multipower12 & Device Carrier
Features:
KVM Matrix-Grid™ function

Result and benefits

Removing computers from workplaces for better working conditions
Central system storage in dedicated server rooms
Access to multiple platforms via the work places
Bridging the distance of different locations in a mixed fiber and CAT-x environment

Since MLB Network had to connect servers and operators in different physical locations from the matrix switches, the ability to mix CAT-x and fiber optical cards in the matrix frame became important. The modularity of the G&D system gives MLB Network the option to expand its (KVM) installation step by step. Since the re-design of MLB Network's KVM infrastructure was complex, the flexibility of G&D's CCD matrix series was a perfect match for short and long term needs.
The CCD 288 system has 18 modular cards which can be used either to connect fiber single mode, fiber multi mode or CAT-x. cables Since both the switch card and the control card are designed in a modular way, it is possible to replace these cards if necessary. With just 9 rack units height the frame is quite small for a 288 port matrix system. The system can be expanded by cascading or by G&D's KVM Matrix-Grid™ feature which delivers more flexibility as a simple cascade.
The system also offers MLB Network a simple configuration via web interface, has the option to configure individual user rights, benefits from easy operation (e.g. switching via individually defined hot keys or by on screen display) and promises high reliability of the system and its components.

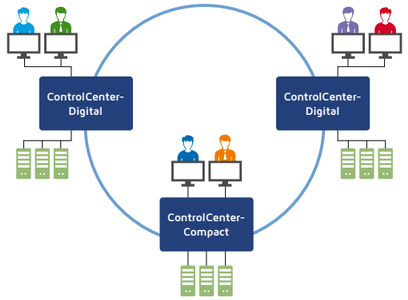
"To accommodate potential future growth in infrastructure, MLB Network is planning to implement G&D's KVM Matrix-Grid™ function for bi-directional access between different matrix frames. This will enable the network to interconnect CCD matrix frames that are installed on different locations within its facility, as if working in a virtual super matrix system.

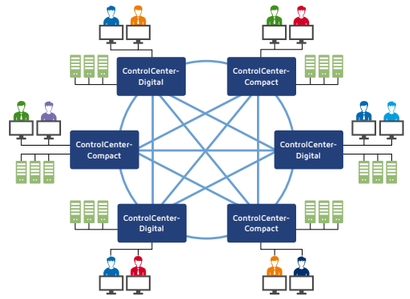
It did not take us long to understand how the system configuration works. Each operator and server module has an individual ID, therefore each module is listed as CPU or CON unit on the web interface. Even an operator or system administrator who has no experience with G&D systems can easily figure out how they work. During the installation process, G&D's U.S. Sales and technical support provided information and assistance directly."

***Jordan Smith,** Engineering Manager*

KVM Matrix-Grid™ example: networked ring

Ring topologies, for example, support redundancy concepts even better: if a connecting line or a node fails, the system finds an alternate path for switching KVM signals. Therefore, users benefit from always available installations.





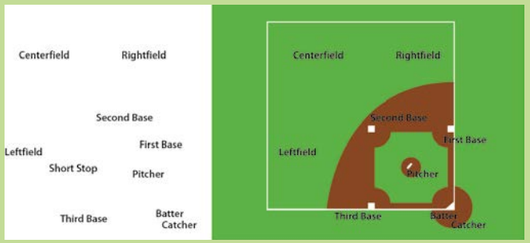
KVM Matrix-Grid™ example: fully connected network

The fully meshed network provides the maximum of accesses between individual matrices. In a later step the system automatically takes over the routing of KVM signals by selecting the ideal path through the grid.

The origin of today's baseball goes back to the middle of the 19th century and took place mainly in the USA where the game is extremely popular. Baseball games are usually celebrated as big events for the entire family and great happenings.

Baseball is played between two teams with nine players on each team. The teams change between defense and offense. A game lasts for nine innings and the team with the most runs at the end of the game wins.

The playing field is made of an infield, which is defined by four bases that form a square, and an outfield. The offense team tries to reach each of the four bases by rounding the infield. For this, the batter (offense) first stands on home plate and tries to hit the ball the pitcher (defense) throws from the center of the infield. If this action is successful and the ball is returned to the playing field, the offense player becomes the runner and has to run to the first base. Meanwhile, the defense players are trying to get the ball under control. If the defense catches the ball before the runner reaches the next base, the player of the offense is out of the game. A flyout occurs when the defense team catches the ball in flight before it hits the ground.



The pitcher tries to throw the ball to the catcher standing behind the batter without the batter being able to hit the ball. If the batter misses the ball three times, it is a strike-out.

After three strikes the offense changes to defense and vice versa.

If the ball is not in the strike zone (an imaginary quadrangle between the batter's knees and the midpoint of their torso) and the batter hits it, it is a strike. A pitch that misses the strike zone is called a ball. After four balls the batter may advance to the next base. If all bases are occupied, the player may move from third base to home plate and the team gets a point. This is called a run.

Groundout – When the ball hits the ground directly after being batted and a defensive player is able to get the ball to first base before the batter-runner arrives.

After the defense has grounded out three runners, the defense team changes to offense.

Home run – A home run occurs when a batter hits the ball in the air over the outfield fence in fair territory. Every player at a base may run to home plate to score a run.

The team with the most runs after nine innings wins the game.

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GAME, SET AND MATCH

How WTA Coverage Got Served

Live sports coverage is changing almost as quickly as our appetite for it

Mallorca Open

Methods of capture, transportation, protocols, control and even delivery are changing. Disparate hardware elements are becoming no more than nodes on multi-lingual networks, with audio and video equipment sending control, audio and video signals across lightweight fibre cabling.

Backhaul technologies can be on a variety of IP protocols, transmission methods are no longer restricted to traditional media formats, and more powerful technology means that broadcasters can produce big events with smaller, cheaper equipment – all the while maintaining the same high levels of quality.
The Women's Tennis Association (WTA) embodies this force of change. The WTA is the principal organising body of women's professional tennis, and governs the WTA Tour which is made up of WTA Premier tournaments, WTA International tournaments, and the year-end WTA Finals . WTA broadcasts are a collaboration between a number of companies, and innovative techniques have been exploited to take advantage of both traditional and newer, flexible transports and protocols.
WTA broadcast delivery is managed by the Perform Group, with all remote feeds going through their new studio complex in Bangor, Northern Ireland. Unofficially referred to as "the Netflix of sport," Perform Group produce, package and distribute content from a wide array of sports and make it available to a range of B2B clients and sports fans across a diverse set of digital and satellite platforms. It would not be unfair to suggest that they are the largest streamer of live sports in the world. In this way, Perform Group incorporate both traditional broadcast and new media workflows, working closely with rights-holders to generate new revenues. Some of the organisations Perform Group collaborate with include the BBC, Sky, the FA, the Premier League, the WTA, William Hill, UFC and ITV Sport.

Their investment in infrastructure is significant, with the construction of a brand-new production control complex in Bangor, Northern Ireland launched January 1st 2017. Design and installation was undertaken by WTS Broadcast, who have over 20 years of experience supplying equipment to the broadcast industry, with an established broadcast systems integration arm based in Leeds.
The Perform Group installation in Bangor was built around three compact Calrec Brio consoles, installed in Control 1, 2 and 3. The Brio consoles are used for all live transmission mixing.

"We've become something of a specialist for the Brio," says WTS Systems Manager Jon Lyth. "In fact, WTS has installed more Brio consoles than any other single integrator or dealer in the world, and we installed the first ever Brio to go live in a small OB Van in the UK back in July 2016."
Which is just as well, as the Perform Group WTA project presented some interesting requirements. Firstly, commentary was to be added off tube rather than at the venue. While this is not unusual, the commentary location is in West London, and the control facility is in Bangor, while venues ranges across all continents and across multiple frame rates. Secondly, each tournament can utilise up to 11 courts, and there can be up to three concurrent tournaments, each with their own feed. Lastly, this needed to be achieved with only two operators per tournament.

"We had just completed the first two Brio installations in more traditional environments; one in an eight camera outside broadcast, and the other in an educational facility. We realised Calrec had produced a broadcast solution we could use in place of something that historically would have been a re-purposed music console," says Jon.
"Coverage from each court consists of four input channels which are sent to the transmission console in Bangor which produces a new stereo main program (PGM) feed. This is made up of clean effects from the Brio's at the venue, and remote commentary which is sent from London over Ravenna IP.

"In Bangor, the commentary feeds are converted to analogue before routing to the Brio – this eradicates any frame rate issues from wherever the matches are being played. Sixteen SDI decoders are presented via the input demuxes built into Ross Ultrix routers which pass the clean effects from each venue via Madi to the Brios".
"Because facilities' bookings change daily it was important for operators to have the ability to create multiple mixes from any combination of SDI audio (from the venues) or commentary (from London). This is where the intuitiveness of the Brio interface came into its own. The drag and drop GUI provides patching in a single table, and the ability to colour code channels and masters; this means that is it simple to colour code channel and masters to produce clear configurations that instantly stand out, making it much simpler for the Operator. This functionality is way over and above what we had been able to produce in the past for this level of investment."

At the other end of the production chain, NEP Visions won the contract for host broadcaster for every WTA tournament, and custom-designed three modular HD flypacks to cover every single match. Each flypack is also built around the Brio console. Simon Crofts is Visions' Sound Guarantee Engineer for broadcast. Extremely well qualified, Simon has been involved in the setup and management of WTA coverage from the outset – in fact, he was a Senior Broadcast Engineer at the Perform Group prior to taking the role at NEP.
"We use flypacks for most of the WTA tournaments – they are highly portable, and very flexible," says Simon. "We typically have two full flypacks for centre court coverage, and a half-size flypack which we use as an add on to a full kit when we cover centre court and court one. The outer courts are usually covered by Sony's Hawk-eye Smart Production systems.

"The flypacks were designed and built by NEP in the USA, with the first deployment at WTA Shenzhen on 1st January 2017. They have been designed with the WTA project in mind and fit operationally within two porta-cabins. This works with the facilities provided at many of the venues – typically there will be two porta cabins available; one for production and one for engineering.
"While video coverage can range from four cameras upwards to 16 or 20 depending on the tournament, the audio plan is essentially the same every time. We will normally place 10-12 court mics, a couple of camera top FX mics, stereo mics for crowd FX, an Umpire mic and radio mics for each coach (in case they go on court during play). Presentation and pre/post-match interviews are often performed using a mix of our systems or local PA microphones from which we take a feed.

"The half kit consists of a 2nd sound desk, 2nd vision switcher, 2nd or 3rd replay station, and additional cameras and camera racking positions. The half kit connects to and shares the router, glue and comms matrix of the main kit, so it's configured as an add on."

"The main infrastructure for the flypack revolves around HD/SDI video with embedded audio, MADI and Dante, with very little AES or analogue audio except for the court microphones. We extend the flypack's IP network outwards from the cabin via multicore fibre allowing us to pick up audio feeds via Dante from around the venue, position RTS Omneo comms panels and Dante belt packs inside the stadium and on the court, and also provide a dual commentary position should there be a requirement using our Dante commentator units."

"On the court we use a 24/8 analogue Calrec Hydra2 stage box to process all on-court microphones, radio mics and venue PA feeds. This unit sits courtside in a rolling rack along with Grass Valley SHED HDXs to help us connect the cameras to the cabin."
"As with all flypacks the cost of shipping is a huge factor, and trying to reduce the weight and size of the kit was a big part of the design. Using multicore single-mode fibre means we can connect everything we need in the stadium (microphones, audio feeds, cameras, comms panels, commentary and other IP devices such as router control panels or robotic cameras) using just three or four lightweight fibre cables. We have dispensed entirely with heavy audio multi cable and excessive lengths of camera SMPTE cable, and rig and derig easier and faster."
Like the Production Control Complex in Bangor, flexibility is key in the design and implementation of the NEP's flypack system.

"Each main kit consists of an Imagine IP3 embedding/de-embedding router with MADI and analogue audio IO along with multiviewer cards. In fact, this is the hub for all signals," adds Simon. "We use VSM for routing control, GPIO processing and monitoring of the devices, and we use a Focusrite D64R 64-Channel MADI / Dante Bridge to bridge between MADI and Dante Networks."
"We use a Brio sound console to mix all the feeds for clean effects, with commentary usually added offsite (see above). The Brio has two MADI cards for connection to the router and RTS comms frame, and a Dante card for access to the Dante network. The court mics, group faders, grams, replay channels and masters use up around 28 faders on the Brio."
"An RTS Adam-M frame provides all the communications onsite, and having MADI, Dante and analogue connections results in a really flexible system. We have multiple paths to route signals around the network, all of our RTS comms panels are Omneo/Dante capable and for any devices that aren't Dante capable (such as the camera CCUs) we use Rednet A16R devices to get them onto the Dante network."
A halfway house between traditional Outside Broadcast and Remote Productions, Perform Group's WTA coverage is lightweight, agile and innovative, where a clear approach to utilise new technologies is paying dividends in all areas from capture through to transmission.

The New Frontiers of Sports Tracking

Next-gen innovations lead to deeper team analysis and a richer fan experience than ever before

If you're a football fan who never misses your team's matches on television, it's a safe bet that you've enjoyed some of the benefits of a digital sports tracking system. Driven by technologies that can track and collect data on the movement of players, officials, and the ball, these systems have been enriching sports broadcasts and team analysis for several years. But sports tracking systems have only recently taken off on a global scale, thanks to a current and ongoing surge in innovation that is pushing the boundaries of the technology to eye-opening new levels of automation, accuracy, and visual impact. Whether they're used to visualize historical data on players and clubs in powerful new ways or to create an all-new fan experience using virtual reality, next-generation tracking systems are redefining the development of team sports and the viewer experience.
In this article, we'll take a look at the bleeding edge of sports tracking technology and describe some of the newest developments that are shaping the sports tracking systems of the near future – and may soon be coming to a pitch near you.

Sports Tracking Basics

There are a few different permutations of sports tracking, including so-called active systems that place a physical transponder or sensor on the player or ball. The focus for this article is on non-intrusive or passive solutions that use an array of optical cameras and radar data-capturing technology installed at strategic areas around the pitch.

The state of the art in this category, ChyronHego's TRACAB, uses HD cameras and advanced image processing technology to build a digital record of the action. At up to 30 times a second, the system captures the precise movement and speed of players, officials, and even the ball. The image processing software then analyses every image to extract X, Y, and Z positions for each object, resulting in a real-time, three-dimensional view of the players' movements. Via open protocols, the captured data can then be made available to a graphics rendering platform for on-screen presentation to a viewing audience or coaching staff.

Sports tracking systems first emerged as internal tools for sports clubs and teams. Today, these systems play an ever-growing role in helping coaches gather insight and assess the metrics of key performance indicators such as distance run, speeds, stamina, team formations, set-plays, and other factors. Coaches can use the information to evaluate team defensive and offensive plays as well as an individual player's performance, and the data can inform decisions such how best to deploy a given 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.

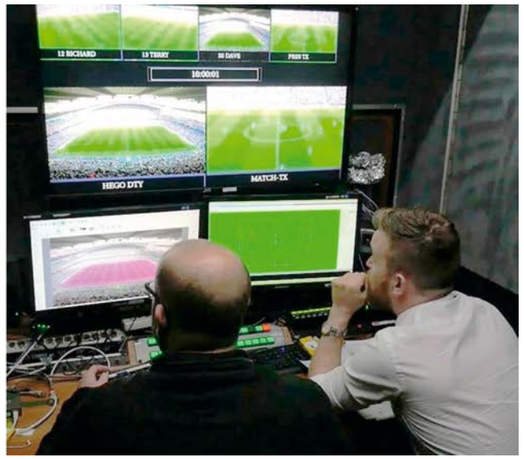
In addition to enhancing team performance, the data from sports tracking systems enables broadcasters to tell a more exciting story for viewers through graphically enhanced replays, or even fully virtual replays in which 3D animations recreate player movements. On-air pundits and expert analysts can better explain the dynamics of how games have been won or lost, and use the data to empirically support their hunches. In addition to powering TV graphics and second screen experiences, sports organizations can leverage this content source for marketing and public outreach; for instance, they can use it to help explain the game and its tactics and highlight star athletes' performance.

Such systems are having an impact on virtually every type of team sport including football, baseball, American football, cricket, and even tennis. TRACAB, for instance, has been installed in well over 300 arenas and is used in more than 4,500 matches per year by major football federations around the globe.

Collaborating for the Future

Building on these successes, two of the world's largest and most avidly followed sports organizations – the Deutsche Fußball Liga (DFL) and the English Premier League – are taking the lead to develop the next generation of sports tracking technology. Not only have both organizations recently renewed their contracts to use TRACAB for their own teams, but they are collaborating with ChyronHego to build powerful new capabilities into the system.

The English Premier League has been using TRACAB to bring a new dimension to its live football coverage since 2013. Going forward, the system will continue to deliver real-time ball- and player-tracking data and enable powerful insight into match play for all 20 Premier League clubs over the 2016/2017, 2017/2018, and 2018/2019 seasons, at 380 matches per season. The Premier League is capable of streaming the live data feed generated by TRACAB to a multitude of visualization platforms, such as broadcast graphics systems and online or mobile platforms, and the data is also being used to support comprehensive sets of performance statistics for sports analysts.



In Germany, TRACAB is installed in all 35 DFL arenas to collect real-time ball and player-tracking data for all Bundesliga and Bundesliga 2 matches. Over the next four years, the system will enable powerful team and player insight and build on the club's valuable historical database of player and team performance for almost 2,500 matches.

In addition, ChyronHego is working in close partnership with the DFL's new subsidiary, Sportec Solutions GmbH, which provides data gathering, storage, and distribution for Bundesliga and Bundesliga 2. With this collaboration, ChyronHego and Sportec Solutions are developing a next-generation optical player-tracking system based on the core capabilities of TRACAB. The new optical tracking solution will initially be deployed for DFL clubs, but will also eventually be marketed to other sports organizations globally.

The Brave New World of Sports Data

These partnerships are already beginning to yield results in the form of powerful new capabilities for TRACAB. One development is the TRACAB Portal, an all-new web-based solution for displaying tracking data and using it to visualize standard team metrics as well as a host of new key performance indicators (KPIs). TRACAB Portal is pushing the boundaries of innovation in sports tracking on several fronts:

Enhanced metric generation. While TRACAB has always had built-in ball-tracking capabilities, TRACAB Portal will take those capabilities further than they've ever gone before. The new system will enable sports teams to collect a richer set of ball data indicating possession, passes, and status (whether the ball is in or out of play). By tracking the speed and duration of sequences in which the ball is in control, this data will drive a new set of KPIs around player performance – such as the amount of successful passes by a single player, how many of those passes were made under pressure, how many opponents were bypassed by the player making the pass, and how many players did the receiver bypass before taking the ball.

Leveraging historical data. Clubs such as the DFL, which has been built a solid database of TRACAB metrics over several seasons of play, will be able to use TRACAB Portal to present the historical data in powerful and unprecedented new ways. They will be able to create benchmarks of player performance over time to inform decisions such as which players are best for playing certain positions, or how to backfill key players that are out due to injury. Sports clubs will also be able to use the historical data to make cross-season comparisons and track team performance from season to season.

Tracking player development. With the enhanced data in TRACAB Portal, clubs will be better equipped to track and manage players' physical characteristics over a period of time; for instance a player's top speed value and how his speed is affected after an hour of continuous of play, or how many sprints and jumps a player can make before he begins to tire. By creating an understanding of the stamina and ability of each player, these metrics will play a vital role in preventing injury – for instance, knowing when it's time to pull a player out of action and sub in another, or monitoring a player's performance just after he returns from an injury break.

Enhanced visualization for broadcast. The enhanced data from TRACAB Portal will automatically feed into the broader ecosystem of ChyronHego's sports solutions to created powerful live displays of the data. Driven by automation, these tools create new efficiencies for broadcasters and give viewers a richer and more exciting experience than ever. Using ChyronHego's Paint telestration tool, for instance, broadcasters can import the TRACAB data feed in a highly visual manner to show speeds, distance between players, and team shape, plus other key metrics (a companion product, Coach Paint, offers the same capabilities to coaches for team and performance analysis). Likewise, ChyronHego's Virtual Placement tool can leverage the TRACAB data to place compelling virtual graphics into the live video feed.

Making History: TRACAB Meets VR

One recent breakthrough in the sports tracking world deserves a mention: an exciting marriage of TRACAB and virtual reality (VR). On Feb. 26, 2017, Fox Sports Netherlands (FSNL), the official broadcaster for the Dutch football league Eredivisie CV, conducted the first-ever live broadcast of a football match enhanced with computer-generated VR. The VR version of the match between the Eredivisie clubs Feyenoord and PSV was streamed in real-time to Twitch, a social video site for the gaming community, where it captured a live online viewing audience of over 20,000 total views.

FSNL understands that keeping younger audiences engaged over an entire 90-minute football game requires innovation and a different approach. To that end, the broadcaster teamed up with Beyond Sports, a Dutch provider of international VR sports technologies, and ChyronHego to prove the concept of VR in live sports and deliver a highly immersive and interactive viewing experience. ChyronHego and Beyond Sports created a workflow in which the live tracking data generated by TRACAB could be visualized in a VR format. After operators calibrated TRACAB to provide the positional data for each player, they then assigned the player's name to the TRACAB-generated "token." This data was then fed to the Beyond Sports virtual engine, which presented the avatars on the field and determined their actions based on the live players' movements.

It's All About Data

The common thread in all of these technology developments is data – large quantities of it, captured in real-time with the highest-possible accuracy and then visualized in new and innovative ways. FSNL, for instance, has taken on that visualization challenge by proving the concept of VR for capturing and engaging younger audiences. The result is a truly disruptive approach to sports broadcasting that will see wide adoption in the near future. Only TRACAB, working in concert with Beyond Sports' VR engine, could provide the degree of accuracy FSNL needed to create a realistic and believable virtual world for the live match.

HDwireless broadcasts

"WINGS FOR LIFE"

Wireless technology with relais airplane and GPS antenna tracker for World Run in Olten, Switzerland

"Wings for Life World Run" is a charity run, which takes place annually in 33 countries worldwide and is broadcast live. This year, it took place for the fourth time in a row since 2014. The running courses are designed with very long distances, which is the result of this sport event's special regulations: on the course, runners are followed by a so-called "catcher car", which starts to pursue runners 30 minutes after they have started and gradually gets faster. The car catches the runners one by one. The runners' athletic effort is ended, once they are caught by the car. The majority of runners successfully complete between 10 and 23 kilometres; the world's fastest have nearly made 90 kilometres. In terms of time, the run takes several hours until the catcher car takes the last runner of each respective run out of the game. In Switzerland, the run took again place in the canton of Solothurn, in and around Olten. The winner of this race succeeded in achieving a distance of 68.11 kilometres. The live broadcast of such a sport event of this size poses a special task at any location. The leading runners are broadcast live by cameramen on motorcycles with wireless camera systems. This called for a wireless and interruption-free transmission over very large distances. The company HDwireless from Mechernich near Cologne, Germany, was responsible for the run' transmission on May 7th, 2017, in Olten. Thus, the Managing Director Patrick Nußbaum's HDwireless team was also on site for the their fourth Wings for Life World Run.

"Here, we're the complete service provider for video, audio and communication."

HDwireless is often responsible for the broadcast in large areas or for complex video transmission applications and has long-lasting experience when it comes to a secure transmission at major events – from Formula 1 to the SemperOpernball in Dresden, Germany; from cable way broadcasts to large-scale city networks with broadcasts from city centres. The requirements for the Wings for Life World Run in Olten included the recording with multiple cameras and the broadcast of image and sound in broadcast quality using directional transmission. Further tasks included

director's and communication radio for all relevant locations: from the course, the broadcast positions, the production vehicles including OB trucks. The six-hour live broadcast was to be transmitted without disruption across the complete course and time. The so-called "Wireless Video Village", the site of receiving antenna, production vehicles and OB trucks, was to transmit the decoded video signal to the broadcaster.

"The optimum selection of HF broadcast technology and transmission coordination are decisive in the planning phase"

The size of the area covered, the canton Solothurn's topography and the timeframe of around six hours of live broadcast immediately suggested the use of a relais airplane instead of a download link via helicopter. The advantages were numerous. Helicopters have a high flying price per minute and cannot stay in the air for the whole duration of the event. They need to refuel. In order to do so, they either need to head for either a regular airfield or a temporary landing location, which has been approved and constructed solely for this occasion, where a fuel truck can refuel the helicopter. Both lead to an inevitable and undesired interruption of the transmission. Additionally, helicopters fly considerably lower than airplanes. This has disadvantages for the directional radio in the area to be covered and causes a grave dependency on the weather during the event. During bad weather or even a thunderstorm, the helicopter has to terminate the broadcasting operation and land. The relais airplane on the other hand circles at the optimum altitude above the broadcast region, its interruption free and thus considerably more cost-effective. For this project HD wireless selected a German flying partner that could lift off in Germany and circle above Solothurn for the duration of the broadcast. Additionally, the airplane's equipment including prepared wireless technology in the flight racks was easier to handle from Germany with no inconvenient customs proceedings.
After the approved and completed deployment, the airplane simply returned to its German airfield. The relais airplane's task was to receive the HF data signals from the motorcycles' wireless camera systems via antenna and to transmit these to a receiver in the Wireless Video Village. For the transmission of the video data from the motorcycles, the latter were accordingly prepared and equipped. For this, HDwireless cooperated with TVtek, which offeres customised motorcycles on which the cameraman sits on the back and can film with a hand camera. The wireless camera systems installed on the motorcycles are based on Sony PDW 700 cameras with a 1080/50i image format. The motorcycles were equipped with broadcasting technology in the HF frequency range between 2 and 3 GHz for the live broadcast and additionally with a frequency range of 450 to 470 MHz for communication with the director. For this purpose, HDwireless planned an in-house developed data network for use on site. GPS position information are very important for projects with moving camera transmitters, flying relais stations and also special receiver devices. GPS information not only serves as position control but also to operate – manually for the pilot's flight course or even automatically for the HF antenna. This way, the GPS positions could be played into Google Earth for a clear visualisation and then for example made available to the director. For the optimisation of the receiver quality, the pilot could adjust the relais airplane's route using the GPS position data. An automatic processing of the GPD data for the antenna systems' receiver optimisation can now also take place using HDwireless's in-house "GPS antenna tracker".

"With our new GPS antenna tracker we are able to significantly improve the directional audio quality of moving HF senders"

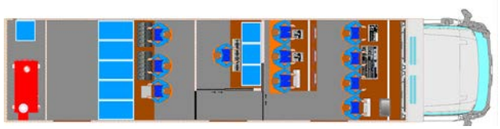
For moving senders, a rigidly aimed antenna inevitably receives signals fluctuating in strength, depending on the respective sending position. Sport events such as marathons or cycle races naturally stretch over large areas. Cameras, senders and relais stations are thus always moving – as was also the case for Wings for Life with its particularly long course. The transmitter range had an especially large influence on the radio link's transmission reliability. And this could be considerably increased using the new HDwireless technology – by not rigidly aiming the antenna but rather flexibly adjusting according to the mobile sender. The system was developed, constructed and built as a prototype for the first tests by HDwireless at the beginning of the year. The in-house software constantly aligns the GPS tracker's alignment with the mobile sender's GPS data. In doing so, the optimum setting for the radio transmission is calculated using the position data and the attached antenna are set freely rotated and swivelled. The system operated in a very variable way and can follow senders on vehicles or be used for download links from helicopters and airplanes. This way, broadcasting chains from cars can be created in a urban environment, where the GPS tracker with its antenna is mostly positioned on a high building to allow a disturbance-free transmission in an urban setting. In contrast, the maximum radio distances in the "line-of-sight" between a flying sender and the GPS tracker on a high mast can be achieved in a direct transmission path without structural or geographic obstacles. Meanwhile, the system is available as HDwireless GPS antenna tracker and enables an even more extensive broadcast of widespread events with simultaneous transmission stability and cost effectiveness. At the World Run in Olten, the antenna alignment took place according to the relay airplane at 10,000 feet altitude; its GPS position data served to fully automatically align the GPS antenna tracker.

"In the end only the uninterrupted, smooth operation counts"

The signals from all time synchronous runs worldwide were gathered in the broadcast headquarters in Salzburg, Austria. The different sources for the World Run's live broadcast were created and the live programme for RedBull-TV and the Internet stream were produced. The broadcaster supplied the live signal via satellite from Olten from the OB truck in the Wireless Video Village. Here, HDwireless operated its HF receiver and signal conversion stations. For this purpose, the GPS antenna tracker with its antennas was located on a 40 metre high riser in order to receive the HF signal directly from the relais airplane. The signal reached the HF control station, which was located in HDwireless's RF1 production vehicle, via HDwireless RFiber technology. Here, the signals were converted and decoded for the transmission as a video signal to the OB truck. Additionally, the RF1 served as headquarters with its own communication network and transmitting stations for the team and director's radio. At the same time, the GPS data from the data network was read out here and used to operate the GPS antenna tracker on the 40-metre riser. Extensive planning and radio communication along with a customised technical set-up needed to be implemented for a reliable transmission of video signals in a 1080/50i format – to thus provide vivid live images of the runners. The major event Wings for Live with its complex requirements regarding HF radio transmission is an excellent case study for a large-scale video and director radio solution. The application and the coordination of all components including customised solutions such as the GPS antenna tracker enabled a reliable and also cost-effective realisation.

www.hdwireless.tv

Hitachi Manufactures Sri Lanka's First HD OB Vehicle for HIRU TV

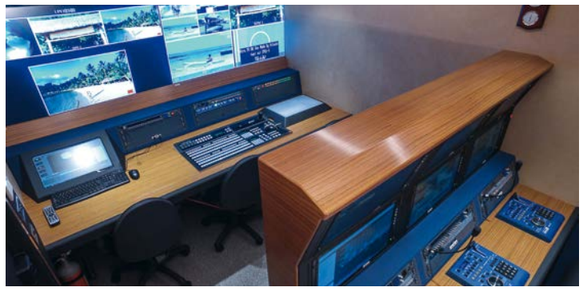


Only innovative approaches will make a difference and grow the Outside Broadcast (OB) market. From its state of the art design and manufacturing centre in Istanbul, Hitachi Kokusai Electric Turkey provides innovative solutions that make life easy for broadcasters.

Based in Colombo, capital city of Sri Lanka, national broadcaster Hiru TV gets Sri Lanka's first HD OB production vehicle that was designed, built and commissioned by Hitachi. This vehicle's concept, based on OB-BOX™, is a milestone for Sri Lanka's broadcast market. Hiru TV authorities were very impressed by the Hitachi demo vehicle at the Broadcast Asia 2015 exhibition and then started the discussion & negotiating process with Hitachi. Hiru TV comments; "Our engineering, production & programming and other relevant departments got together and made our requirement & design. Then brain storming with Hitachi, we finalized the design & technical specifications. Finally we fine tuned it and put in to the paper before finalizing the project. The project timeline was a tremendous experience. The technical expertise, support and coordination are up to the expectation." Hitachi specially designed and equipped a 10 meter OB-BOX™ for Sri Lanka's very humid and rainy weather conditions based on a Mercedes Antos chassis. The OB-BOX™ is capable of accommodating 13 operators in three independent operational areas (audio, production and engineering). It offers a comfortable and ergonomic working environment. Each room inside the OB-BOX™ has an individually controlled air conditioning system.
The brand new production box runs twelve (12) Hitachi 3G SK-HD1300 Fiber Cameras and wide choice of lenses. It is fitted with Ross 36 Inputs 22 Outputs 2ME's Video Switcher, Imagine 48x48 video router and imagine communication's glue that includes frame sync, audio de-embedding and embedding facilities.

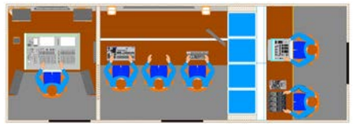
Creative Technology Concept for Today's Global Broadcast Community

OB-BOX™ - a patented concept that is a compact, modular and expandable OB system solution and facility. OB-BOX™ is delivered to the customer on its own and then it can be mounted on any type of vehicle chassis with proprietary fixing kit. OB-BOX™ can be mounted on any suitable vehicle chassis or on a trailer so any kind of vehicle can be used for transportation. This concept provides flexible, cost effective, expandable vehicle advantages for customers. It significantly reduces the manufacture and delivery time in any market worldwide since it removes the need to source and ship an appropriate vehicle for each customer.

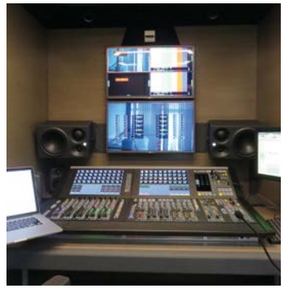


The box is equipped with the SLOMOTV 8 Ch. slow motion, BMD 3G/HD recorders, Dayang graphic system, Dayang HD 3 Ch. Video Server, Yamaha 64 analog, 32 digital audio mixer, Sennheiser 20 channel wireless mic. system, RTS 32 ports wireless intercom system, Imagine 10 Channels Up/Down/Cross Convertor frame synchroniser allowing up to 8 Externals and Glomax Off-Air System with 6 meters motorised mast. To support the OB-BOX™ facilities an on-board 25KVA silent generator has been fitted. Featuring the latest technology from many leading industry vendors, the vehicle is well equipped to provide flexible facilities to local production teams or international crews shooting in the region. Its implemented workflow is suited to servicing a wide range of events including any kind of sport, entertainment programs, conferences, open-air events or reality shows.

ITV Studios Select Hitachi To Provide a New OB Trailer for Coronation Street



ITV Studios Coronation Street has been followed with great appreciation by its audience since 1960 and is the longest running continuing drama in the World. The production team selected Hitachi Kokusai Electric Turkey to provide a new OB Trailer which is based on the OB-BOX™ concept, for increased efficiency and new ways of working within their existing workflow. "The Coronation Street technical team has known of Hitachi for many years. The capability to build a mobile gallery to our specification was initially investigated after seeing the OB-BOX at IBC in 2016" said Gary Westmoreland, Director of Technical Operations Continuing Drama at ITV Studios. Hitachi faced several challenges in order to meet ITV's requirements. The trailer had to be light enough to be towed by a normal vehicle, it had to be small enough to be able to pass along narrow streets and also provide the best quality production capabilites. Mr. Westmoreland added "Hitachi's team were extremely flexible and proactive from the start. Their practical advice and technical know-how collaboratively shaped our thinking to develop a solution that introduces efficiency and new ways of working into our existing workflow."
The brand new production trailer is designed to work as a mobile production gallery for the programmes additional new studios and their existing facilities. The specified equipment had to interface easily with those existing systems in a way that's operationally efficient. Simplicity of operation is key given their production turn-around. The totally customized Hitachi OB-BOX™ trailer is equipped with four of the customer's Ikegami HD Cameras, Clear-Com intercom System and ETC lightning system. It is also fitted with a FOR-A 1ME Video Switcher, 40x40 video router and FOR-A Multi-viewer and frame sync. Crystal Vision Glue products are employed, including audio de-embedding and embedding facilities. The trailer is equipped with Studer Vista 1 Black audio mixer, Evertz SPG and Ikegami monitors.



The OB trailer operates as a mobile production gallery, giving all the facilities for Production, Sound, Vision- Engineering and lighting in whichever studio it is connected to. Recording and playback is done remotely on the Avid Airspeed in the Coronation Street studios' CAR. All the studio wallbox signals are fed via fibre systems from the mobile gallery. Engineering and lighting in whichever studio it is connected to. Recording and playback is done remotely on the Avid Airspeed in the Coronation Street studios' CAR. All the studio wallbox signals are fed via fibre systems from the mobile gallery. The OB trailer will also be able to be used off-site with on-board recorders for ingest later into the television programme's servers, giving fabulous flexibility from this new facility. Mr. Westmoreland interprets the project process as follows; "To date we've found Hitachi to be extremely helpful and supportive. The project involves a build outside of the UK and whilst we were nervous about this initially, the Hitachi team in the UK and in Turkey have made the experience seamless. The whole team have been a pleasure to work with."

Hitachi Kokusai Electric Turkey (HKTS) was formed in the Tuzla free trade zone near Istanbul to provide innovative approaches to broadcast and communication challenges. From its 8.000 square meter production facility, HKTS serves to international broadcast industry and government institutions with flexible, customized, cost effective and value added turnkey solutions. With based on the Kaizen Philosophy and a concentration to only high technology products, systems and solutions, HKTS make life easy for broadcasters. Hitachi's strategy has been to create a centre of excellence in OB facility creation and broadcast systems integration all under one roof within the Tuzla free trade zone. The company has brought together many of the broadcast industry's most creative minds: their skills stretch from strategic conceptualization and systems integration, through to specialist coach building capabilities.HKTS utilize a blend of their own broadcast system components and also equipment from many of the world's leading technology vendors. The objective is always to blend the perfect combination of production tools to meet the specific requirements of each customer.

HITACHI
Inspire the Next

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NO COMPRESSION

NO COMPROMISE

The advancements in camera technology are coming through thick and fast. HDR, 4K and even 8K are all prevalent in the latest cameras on the market now. Lets be honest, if you are invested in a great story, then visual clarity helps propel it to new levels.

Ikegami, has always been at the cutting edge, whilst still holding its reputation of being reliable and robust. In 2016, Ikegami introduced its UHK-430 camera, the world's first camera with the ability to output an uncompressed 4:4:4 resolution RGB transmission of a 4K video signal.

Designed for use in the studio and on location, Ikegami's UHK-430 features three 2/3-inch 4K CMOS sensors and RGB prism optics. Equipped with the new AXII ASIC chip for low power consumption and new processing features, the UHK-430 is capable of 40 Gbps transmission using standard SMPTE hybrid fibre camera cable. Along with the ability to transmit an uncompressed 4:4:4 4K video signal, it also boasts the capability to transmit eight HD channels from CCU to camera, including multiple return video and two HD prompter video channels, plus one HD trunk channel from camera to CCU, allowing for greater flexibility.

The advantage behind the 4:4:4 uncompressed transmission lays in the fact that it produces better quality images than a compressed 4:2:2 transmission. When transmission is made with 4:2:2 bandwidth, it affects the chroma key performance because the bandwidth of the colour difference (Pb/Pr) signals are restricted. Ikegami's 40Gbps transmission system is transmitted as 4 x 10Gbps with WDM (Wavelength Division Multiplex), benefitting from extended bandwidth, eradicating the issue of loss of transmission distance compared to other 10Gbps transmission systems. The 4K video signal processing is done at the CCU. This means the processing such as lens aberration correction, DTL and colour matrix are processed inside the CCU. It is for that reason Ikegami employs the 40 Gbps bandwidth, to enable the uncompressed video signals transmission, which is the best possible option for these video processing circuits. Ikegami has a saying, 'No compression, No compromise', and taking away all the technical ins and outs, that is what it is about. Transporting the image that has been so beautifully captured without compromising any of the quality.

The industry is excited to talk about the amount of pixels and frame rates in a shot, which undoubtedly is paramount to the progression of our industry, but how we handle that that data is surely just as important. The word data is not one that immediately evokes a feeling of creativity, yet it is so important to the final result – which is why Ikegami is proud of its 'No compression, No compromise' ethos. The CCU-430, the camera control unit, ensures the uncompressed magic can happen. Connecting to the camera head by 4km of SMPTE hybrid camera cable, full bandwidth video, audio and control data plus power is carried to the camera. This can also happen with up to 10km of dark fibre, in situations where local power is available for the camera, allowing smooth and easy migration from HD to 4K production. As Ikegami is constantly looking to the future, its CCU-430 Camera Control Unit has been designed to support 3G-SDI, 12G-SDI, Simultaneous-Output and VoIP interface. This is made possible by swapping the rear plug-in module, which further allows flexibility to support greater resolution, frame rates, colour fidelity and future trends for 4K systems, once again recognising a content creator's need to be flexible.

But of course, as well as being able to transmit high resolution images, the beauty of the UHK-430 is that it also captures in high resolution. Originally launched with 4K-only it now has the capability to capture in HDR, thanks to the AXII next generation high-speed video processor. Ikegami developed this processing engine in anticipation for the next generation HD, 4K and 8K format cameras. The AXII boasts the ability to perform high speed processing of HD, 4K (4 x HD) and 8K (16 x HD) super high-resolution video signals in various formats and frame rates. Ikegami is set to use the AXII processor as a platform to accelerate product development, allowing Ikegami to continue to be pioneers in its field. The company has proven this repeatedly. Most recently with its SHK-810 8K camera, which was developed in collaboration with Japan Broadcast Corporation (NHK) and famously used in the 8K broadcasting of the 2016 Rio Olympics in Japan.

Ikegami has always made it its mission to be the driving force behind beautiful images, and through its determination on being successful has not only created an industry first, but a world first. Uncompressed video is the future; just remember 'No compression, No Compromise'.

CASE STUDY – BEDAYA TV

Bedaya TV is an established private satellite TV channel based in Riyadh, Saudi Arabia. It produces entertainment programmes including reality shows. Recently the channel needed to equip a brand-new production facility for a new reality show based in an outdoor camp, which was to broadcast live 24 hours a day for 90 days.

"We required high quality HD cameras that could be mounted on Eagle Pan Tilt PTE 300 heads as part of the fixed rig," said Abdelaziz Al Oraify, Owner, Bedaya TV. "We looked at several manufacturers but Ikegami cameras gave us the best picture quality for this production."

Bedaya TV purchased 25 Ikegami HDL-57 and five HDL-45E cameras for the production. The HDL-57 features a 2.5Mega-pixel CMOS sensor that achieves superb picture quality. The sensors include significant circuitry within the sensor itself, resulting in a digital video interface between the sensor and the Ikegami camera DSP, all in a very small device with low power consumption. The CMOS sensor includes native progressive and interlace modes for multi-format HD operation. The HDL-45E Multi-purpose Compact HDTV Camera provides superior picture images with the latest 14-bit A/D converters and, due to its lightweight construction, is ideally suited to being mounted on a pan and tilt head.

Osama Salah, Chief Engineer, Bedaya TV, added, "Ikegami is a trusted brand, and we have found the cameras very reliable."

CASE STUDY – DUNYA MEDIA GROUP

Dunya Media Group, the Pakistani media organisation, operates four satellite TV channels across the country. Dunya News National offers current affairs programmes and infotainment shows; Lahore News HD is the first HD 'metro' channel in Pakistan, featuring news and current affairs specific to Lahore, the country's second largest city; Dunya News International is dedicated to international news and infotainment shows; and Dunya Entertainment runs recorded entertainment programmes. The company has used Ikegami camera systems for nearly 10 years, and recently updated some of its studios with new Ikegami models, following an RFQ process. Dunya News is currently an SD channel so the technical operations team opted for 17 HL-65w cameras across three studios in Lahore, Karachi and Islamabad. Seven HDK-55 camera systems were installed across two studios in Lahore for the Lahore News HD channel.

"We chose the HDK-55 as it was compatible with our setup relating to QTV and tally. It also offers excellent picture quality, providing HD as well SD outputs, and fits well within our budget," explains Zubair Rasheed, Head of Technical Operations, Dunya Media Group. "The management is very satisfied with the results that the Ikegami cameras provide."

Besides the camera channels, Dunya Media Group also has Ikegami HLM-1705WR monitors in its edit suites and PCRs.

"Ikegami is a trusted name which offers sophisticated yet robust solutions," adds Mr Rasheed. "As well as picture quality, we also appreciate the value we get from Ikegami because their equipment is reliable and lasts a long time – in fact we still have some Ikegami cameras purchased in 2008 that are still functioning."

Ikegami

PROXIMUS LEAGUE & CLOUD PRODUCTION

Belgium's second football division, the Proximus League, has provided greater results than the action on its pitches immediately suggests. Away from the field of play, a groundbreaking technical solution is helping pave the way for a new sports broadcast model.

´Behind the project are Proximus group production company Skynet iMotion Activities (SiA), Videohouse Media Facilities, NEP Belgium and German technology pioneer, Lawo.

With Proximus providing the network and SiA the TV facilities, NEP brings the technology and know-how from some of the worlds' largest live and broadcast events from around the globe, and is one of the leading worldwide providers of outsourced production solutions. For its part, Videohouse is the only full service provider in Belgium offering a full range of audiovisual and multimedia facilities, both nationally and internationally. And it is Lawo's IP Remote technology that is the key to the systems that make it all possible.

"At the start of the season, my MD told me that the good news is that we have the rights for the Proximus league for the next years – the problem is that we have to do 50 per cent more matches but without any more money," explains SiA's Manager of Media Handling & Facilities, Rodrigo Sternberg, terming it "a very concrete business problem".

With a drop in quality an unacceptable means of stretching the budget, Sternberg focused on efficiencies in the broadcast crew and equipment. It seemed clear from the earliest stages that an IP solution was the way forward and, although SiA had conducted a number of its own trials, tried-and-trusted partners Videohouse Media Facilities, Lawo and NEP were brought in for their expertise and experience.

The requirement is to broadcast four games each week over the 30-week plating season – a total of 120 games from eight stadia. The project's "kick-off" meeting took place on 14 June 2016, with the first systems operating by 16 July. The first broadcast match was on 5 August.

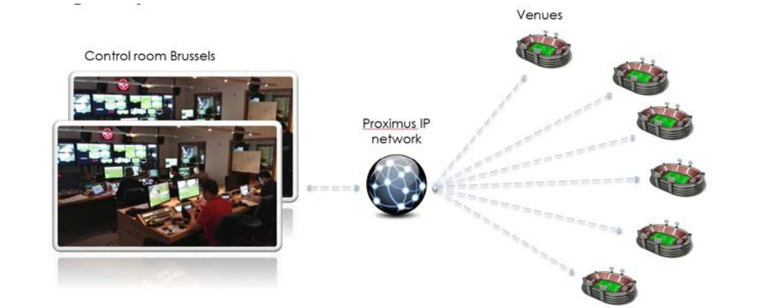
It took SiA just two months to guide the development of the solution, covering matches at eight stadia across Belgium. The result is a reliable and cost-efficient alternative to deploying a "traditional" OB team and setting up remote broadcasting facilities. At the venue, a camera crew of six are accompanied by a single sound installation technician and one video installation technician. Together, they originate the video content for a dual-language Dutch-French commentary.

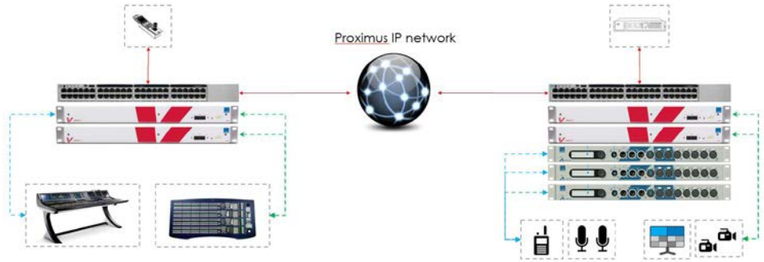
The set-up travels in three flightcases around the country to connect all cameras, microphones and comms in the stadia to the IP infrastructure in two MCRs at SiA's facilities in Brussels. The systems are capable of providing all pictures and simultaneously handling matches in both languages.

"Remote Production gives a lot of new opportunities for broadcasters," says Videohouse Belgium MD, Dirk Theunis. "It is challenging in many ways: technically the most important ones are the reliable IP-connection, encoding with the lowest delay and a well-designed communication system between the local crew in the control room and the remote crew in the stadium. To solve all these issues, we – NEP and Videohouse – teamed up with Proximus and Lawo. The experienced crew did the rest..."

Prior to the Proximus project, Lawo had provided the technology used to link all the stadia in France ahead of the Euro 2016 championships. "We used an IP network that was based on dark fibre," explains Lawo Technical Sales Manager, Dirk Sykora. "It provided very high quality network connections and used a massive fibre backbone. We had the challenge of making a full production – all audio and video – over a single 1GB connection, and it was on a shared network."

As with the setup in France, Lawo's V_remote4 video and audio signal transport solution was one of the keys. Natively able to provide processing in WAN-based remote production, it sits at the heart of the SiA/Promixus project, supporting a bi-directional setup, transferring to and for the stadium. Proximus has provided 1GB networks in every stadium, which are used as primary and back-up connections to the network chain and the switches located in the Brussels MCRs. As well as the audio signals, there are a total of eight video signals going from the both galleries to the MCRs in Brussels,





and eight returns. "Using the same boxes, we send back the programme return for the camera people as well as the video used at the commentary positions," says Sykora.

Everything is received in Brussels by existing control rooms and MCRs, with the infrastructure operating as usual – maintaining consistency for those working in Brussels.

Each of the MCRs "owns" two Lawo V__remote4 units to interface with the football stadia. Either MCR can be connected to any football stadium using VSM panels, which takes care of all the video and audio routing inside the MCR and setting up audio and video streams between Brussels and the stadia.

The SDI signals from all V__remote4 units in Brussels are connected to the video router, while the MADI signals from the V__remote4 are connected to a Lawo NOVA73 audio router in Brussels. At the other end, the three flightcases contain the two V__remote4 units connected to a Cisco switch and three A__line Audio-to-IP interfaces. The camera streams between the stageboxes and the MCR are sent using J2K.

From each flightcase, eight camera streams are sent to Brussels, and two returns are received; 32 audio channels are sent to the MCR, and 16 audio channels are received from Brussels. Lawo's VSM Broadcast Control and Monitoring System controls all devices both in Brussels and in the flightcases, among these are two Lawo mc²56 audio production consoles, a Miranda multiviewer system, Kahuna vi-

sion mixers and all V__remote4 units, as well as A__line boxes in the flightcases.
The control and the management of the complete IP-based production infrastructure is secured by the VSM System, which plays an essential role in the setup, controlling not only the respective hardware but also the streams and bandwidth. The whole system is configured as an "auto recover", which means that every time a flightcase is connected to the network and to the studio, certain parameters are being set automatically. Whenever units are lost in the MCR in Brussels, e.g. A/V, the routing is automatically swapped in the router's client to keep the connection through other devices and using other streams. Using the "auto recover" mode within the network, setting up the flightcases and connecting them to the MCR becomes easy and fast. Another important result of using this method is failsafe connection and stream distribution.

"The beauty is that the complexity is managed," Sykora observes. "We have a single solution handling tally, camera control, audio control, video, connections and monitoring..."
"On the gallery side, we had a close look with a view to finding a more efficient way to produce," Sternberg says, moving on to the broadcast crew. "The result of these deliberations was a five-person team – a director who does the switching; an EVS operator; a technician who works with the technician on the field; a sound engineer who works with the audio technician on the field; and then a senior engineer who takes care of connecting the games to the galleries. We have two galleries running the system, and when the first gallery is on-air with the production crew he starts testing the second game that will go on after the first game. As a result, the same gallery team can produce a second game."
SiA's core activity is football production for TV, as well as providing VoD and TV channel playout available exclusively to Proximus customers. The sports project has been a huge success for the broadcaster and its partners. "It has worked very well," Sternberg agrees, with particular reference to having connected, configured and made the system work at eight stadia in a just two months.
"IP Remote Production definitely will be the future of broadcasting in a certain production segment," says NEP Belgium MD, Timo Koch. "As the worldwide leader in sports production, NEP supports its clients in whichever format is appropriate for their specific production. In partnership with Lawo, we deploy the best technology to deliver these football matches."

"We are incredibly proud of the fantastic achievement of the joint team – two months from start to live is just amazing,' says Skynet Motion Activities MD, Massimo D'Amario. "The IP Remote Production technology used here is an example of how Proximus and SiA leverage innovative technologies to better serve Proximus customers. The technology enables Proximus and SiA to optimise the full production cycle of the live games. It also provides higher value productions thanks to a higher use of fixed assets and synergies in production crews. We are proud of what we have achieved for the Proximus League and are looking to extend it to the Jupiler Pro League, Belgium's first division football competition."
Accordingly, Lawo is regarding the present implementation of this remote IP broadcast model as proven but "small". The aim now is to extend it to a "large" model, which Sykora reports as having been tested.
"We were told that it would never work or that it would take years, but today we already have a set of stadia and a central site," he says. "If more people join, we can have better and richer collaboration and make programmes possible where before it was not possible to do so."

About Lawo
Lawo designs and manufactures pioneering network, control, audio and video technology for broadcast and post production, as well as live performance and theatrical applications. Products include control and monitoring systems, digital audio mixing consoles, routers, video processing tools as well as solutions for IP-based A/V infrastructures and routing systems. All products are developed in Germany and manufactured according to highest quality standards at the company's headquarters in the Rhine valley town of Rastatt, Germany.

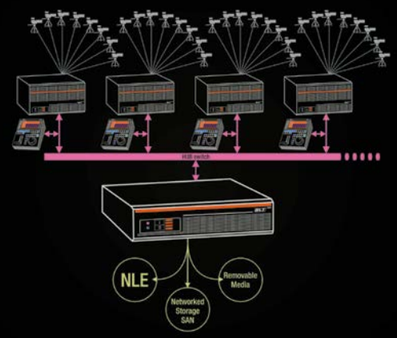
For additional information, please visit the company online at ***www.lawo.com.***

Live TV production, ISO Camera acquisition, post-production:

3 into 1

Costs reduction, no quality compromise, increased productivity and flexibility for repurposing are the challenges faced more and more by TV production companies nowadays.

Getting this message from key customers and with this aim in mind BLT went on to extend its ecosystem of products and software applications to fulfill these requirements. In last few years, live TV productions for sports and entertainment shows leveraged the increased number of viewpoints and camera feeds to get the audience more involved. This led to a significant increase in the number of hours of raw material produced: any frame could be useful in the creation of another remarkable storytelling.



What a relevant resource it could be if, at the same time, NLE users could also access and use the same material, without the need to recapture it in their NLE systems! Live recording through video servers has been a common practice for several years now, making it mainstream the creation, at a glance, of instant replays or slow-motion actions and the editing of one or more highlight compilations while recording. Video servers for live applications feature the often-mandatory loop-recording, that ensures a practically endless coverage of any event. In addition, they must provide enforced reliability not to miss any unique single shots.
Video servers for live applications - and especially those dedicated to sports events - are based on an intra-field Codec to avoid motion portrayal artifacts, that could damage the action. The essence material could not be seamlessly digested by post-production NLEs. The BLT solution to cover live applications, which ensures good operation user speed, guarantees reliability and enables interoperability with post-production environments is "BLT Central Station": a gateway between the production streaming network and the post-production file-based workflow of the NLE.

BLT production system area main focus is capture, record and playout of material for immediate live on-airing. At the same time, the material is fed to BLT Central Station and comes out as files for the post-production NLE. The BLT Central Station gateway can perform format rewrapping or transcoding operations on the fly. The post-production workstations may be either interfaced directly by means of a network or fed by file-based material (i.e. the assets) in removable physical media HDD or SSD cartridges. This kind of affordable workflow allows studios or OB-Vans to deploy the same equipment and technology for live sports coverage, pre-recorded show production and ISO camera recording of live concerts, just to mention only few examples of additional storytelling.

BLT
italian emotion since 1959

Agile news-gathering vans for ORF

– empowered by Mobile Viewpoint technology

ORF is the national broadcaster of Austria. Established in 1955, the television and radio broadcaster transmits across the country. With a strong focus on news, the broadcaster operated a series of small outside broadcast (OB) vans, mainly with audio programming capabilities, to deliver news from across the country.

However, after over a decade in use, there was a strong need to update these vehicles and in doing so incorporate audio and video capabilities, as well as online newsgathering features. The new vans would incorporate internet, video, and radio production and IP-based streaming.

The project requirements

The broadcaster required a collection of vehicles that would enable the quick and efficient collection of news, as it happens, with the ability to transmit stories back to regional studios or ORF's main studio in Vienna. The project for a new type of SNG and CNG van was put out to tender in Europe, a collection of vehicles that would enable the quick and efficient collection of news, with a heavy emphasis on looking for a provider that could deliver a high-quality video encoding capability.

"We had a list of requirements that were important to us, and wanted to see just how the different providers proposed we fulfil them," explained Christian Knoll, Planning & Design Broadcast Production Systems, at ORF. "As a result, we were quite open minded when it came to the video encoding element of the project."

ORF had the requirement for those vans to stream high quality video and audio content, with as small delay as possible, from anywhere in Austria to any one of its nine studios located throughout the country and to its main studio based in Vienna. Multi-point distribution was key for the project, with each van capable of transmitting to all studios at the same time, if necessary.

In addition, due to the diverse geography in the country and weather conditions, ORF wanted the vans to be able to transmit via 3G/4G cellular technology as a failover should the KA-SAT be affected.

The solution

The tender was awarded to SATCOM, a German-based company with a 25-year reputation in television production and designing OB vehicles for newsgathering. Based on the requirements for the project, SATCOM brought its reseller partner Mobile Viewpoint onboard. Mobile Viewpoint designs, develops and implements a host of IP transmission solutions targeted at industries including broadcast. Its range of products include mobile encoders and decoders, ideal for an SNG project such as the one for ORF. Working closely with SATCOM, Mobile Viewpoint put forward its WMT Agile LiveLink mobile encoding solution to fulfil the requirements of the project.

"After winning the tender SATCOM told us what they had in mind, specifically using technology that offered a highly innovative approach. They scoped out the benefits and functionality of the solutions and we agreed to test them," said Knoll. "After seeing the WMT Agile LiveLink in action, within one of the vans, it is clear to see that this technology really is very well suited to what we wanted."

ORF was particularly impressed with Mobile Viewpoint's ability to bring IP over satellite and cellular bonded connections into the van. Importantly, the Mobile Viewpoint technology makes the transmission process more effective and efficient, not only by enabling satellite, mobile and normal cable-based technology all at the same time, but by providing an intelligent connection. The technology is able to decide which method to use based on the availability of bandwidth or signal, without any intervention from the operator.

Following the refining of the project's requirements, Mobile Viewpoint demonstrated the solutions — mobile encoders and decoders, along with the WMT Agile LiveLink. The WMT Agile LiveLink can be mounted onto the camera or in a backpack for a more mobile solution.

It is a ruggedised transmitter that encodes video at H.265/HEVC and bonds eight combined 3G/4G connections for high quality live streaming using Mobile Viewpoint's award-winning bonding technology. H.265 live video transmission offers the same quality at lower bandwidth consumption, but also saves money at data cards. It is also possible to add Wi-Fi and Ethernet connections to maximize the upload capacity. Its aluminium design makes it extremely sturdy and will survive accidental drops of more than 2 metres. All this while still offering up to eight x 4G modems, HD-SDI, HDMI input, a LAN connection, satellite/KA-sat/BGAN support, an integrated antenna and 120GB of storage for recording video locally, ready for editing.

The vans were then designed and built by SATCOM, with Mobile Viewpoint working closely with its partner in integrating the hardware and software into the vehicles.

"One of the challenges for this project included changing the antennae array on the vehicle with relative ease," said Michel Bais, CEO of Mobile Viewpoint. "ORF wanted the mobile encoder to be mounted in the SNG van, by default, but with the added capability of being removed quickly, if needed, and placed in a backpack."

Mobile Viewpoint designed a customised antenna mount for the project, which could be used on the roof of the SNG van. This included finding a mechanical solution to ensure that all the connections to the device could be decoupled in one step, as well as designing an antenna to be used with the WMT Agile LiveLink that can then be placed into a backpack and taken a distance away from the van. The company also, in accordance with ORF's requirements, made significant changes and adjustments to the user interface for the encoders and associated software inside the van. The broadcaster wanted crews in the vans to be more autonomous and able to capture the footage and determine its destination, instead of relying on staff in the master control room (MCR) in Vienna to do so. Mobile Viewpoint was able to customise the user interface to ensure that operators within each SNG van are able to select which decoder to use, effectively transmitting the content to a regional studio of their choice, instead of first sending it to the MCR. This functionality saved both time and money as no additional staff are needed to man the MCR, existing staff within the control room are not under pressure to perform this task, and newsgathering staff in the field can be more nimble.

The results

Almost a year after the project was awarded, the vans were delivered to ORF. Mobile Viewpoint was instrumental in the testing phase of the project. Support teams collaborated with ORF operators in getting the SNG vehicles up and running, implementing the software, providing updates and fixing any bugs.

"The intention of the project was to have SNG vans that are able to get to the location of breaking news quickly and effectively, being the first on location and bringing back the stories to regional offices or our main studio. This is effectively what Mobile Viewpoint has helped deliver and we are really pleased with the results and performance so far. These vans are part of our long-term plan and will continue to add value well into the future," concluded Knoll.

ND SATCOM

ORF

B K NÖ OÖ S St T V W

MOBILE viewpoint

opticalCON® MTP®24 PASSES STRESS TEST ON THE TOUR DE SUISSE

The cyclists on the Tour de Suisse pick up the pace. More and more people are gathering on the side of the road. The participants seem tense. They go faster and faster. Soon there are just a few meters to go before the finish line. Now is not the time to show any weakness. Find whatever strength is left. The spectators cheer. Nerves are on edge. Just a few centimeters separate the cyclists. Who will emerge victorious? Cut. The winner throws his hands in the air. The camera records the competitors' joy and relief. From the front. From behind. From different perspectives. In slow motion. The combined force of the emotions reaches millions of viewers at home in front of their TV screens. This is all made possible by tpc switzerland ag – the leading broadcast service provider in Switzerland – equipped with the latest Neutrik technology.

"The opticalCON® fiber optic connector system was subjected to an extreme stress test during the Tour de Suisse", says Martin Sturzenegger, the man responsible for technology in tpc's broadcasting van. The broadcasting service provider is a subsidiary of SRG SSR. tpc stands for professional production, provided through long-standing know-how and innovative technologies. Sturzenegger is supporting the complex outside production for the ninth time and is impressed by the robustness of the optic connector system. Because what viewers in front of their screens do not see is the work that goes into the professional images behind the scenes. Unlike in a studio, where cables are carefully laid, tied, packed and tided away in air conditioned areas, outside production involves extreme conditions.

Martin Sturzenegger
responsible for Technology and live events at tpc

Challenge: Broadcast

Over the course of nine days, the cyclists wind their way across the whole of Switzerland, cross two national borders, climb mountains up to 2,400 meters and test their strength in beautiful valleys. Whether in glorious sunshine and temperatures well above 30 degrees, in driving rain or in snowy conditions: The team and the technology always have to work. Without a break, every single day. This demands tremendous mobility and flexibility, not just from the team, but from the technology as well. Martin Sturzenegger appreciates the many years of cooperation with Neutrik and the high quality of the plug connections: "You have to trust the connections, then you can trust that the technology works." For Frank Studer, product manager and responsible for fiber optic systems at Neutrik, this is very encouraging. "Our customers' trust is particularly important to us. Neutriks opticalCON® offers a standard that you can rely on." To ensure technical flexibility, Martin Sturzenegger came up with a trick for the Tour de Suisse. He found a strategically good point and placed a hub there, so that he could transmit the signals and save cable. Sturzenegger wasn't always sure that the plan would really work. Nevertheless, after a few test runs he decided to use the opticalCON® MTP®24 as the single cable between the broadcasting van and the assembly point. "For me, that was the most important cable in the production of the Tour de Suisse, because we only had this one cable from the hub to the broadcasting van."

Organized chaos as usual

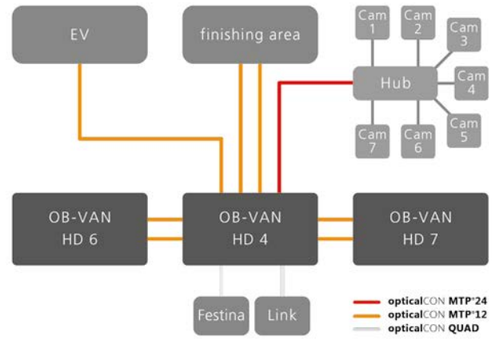
For the fiber optic specialists' team, a cycling broadcast means maximum possible effort. He started planning three months before the start of the fourth largest cycle race in the world. He went through the individual stage ends, checked the local conditions, assessed the situation and created the vehicle plan. He is always open to new technology and is keen on to try them out for himself first. Two days before the start, he was confident and in good spirits ready for the race.
Seven production vehicles started the Tour de Suisse and had to be taken to a new stage end every day for nine days long, brought into full working order and then dismantled again. In the interim period, they produced TV signals for license holders around the world as well as Swiss television. Every day around 4.5 kilometers of cable was unrolled. In Sölden, two cameras connected to each other with seven kilometers of cable even provided live images from inside a tunnel.

Live broadcasting starts just before 4 p.m. and continues for two to three hours. This means that two hours after the racers cross the finish line, the entire team including its equipment must be ready to leave. His team always has to function, every minute counts. The conditions on site reflect this. The broadcasting vans are lined up at the finish line. Cables run from all of the broadcasting vans, with no regard for the fragile technology, always looking for the quickest route. Only the architects of these constructions know what is going on. Individual cables join together in junction boxes, others get lost along the race route against a blank backdrop. Grass, podium, asphalt or gravel – if that is the shortest route, that is where the cable will go. If there is a puddle or the cable is in the sun, that doesn't matter. The temperature and the weather do not get in the way here, they are ignored.
Repacking all the technical equipment means real stress for the sensitive system: Cables are coiled by using force, across fields, through mud, dust and rubble without regard to any obstacles. Sturzenegger trusts that connectors are not left behind and are not damaged. The team has no time for repairs. This is center stage for one of the most professional broadcast productions in Switzerland. And this is completely normal, it is not an exception.

Reaching the finish line with quality in mind

"The proven opticalCON® fiber optic connector systems from Neutrik are designed to support our customers in such extreme conditions", says Frank Studer. The opticalCON® MTP® cable connector is characterized by the robust metal casing and heavy-duty strain relief. The innovative spherical dust cover protects the fiber optics from dirt and minimizes maintenance costs. These characteristics are particularly important for use outside. "Broadcast is extreme and requires resistant and reliable solutions", says Sturzenegger. Franz Studer gladly accepts this challenge: "We work closely together with our customers and try to offer solutions to prevent problems."

The connectors between the largest broadcasting vans use opticalCON® MTP®12. Safety was the top priority: In order to stay flexible in case of a fault, the failure risk was divided between two MTP®12 systems. One transferred the mobile signal from the aircraft, helicopter and four motorcycles, the other transferred the signals of all cameras from the finishing area. Neutrik is familiar with the challenges of the interaction between audio and video technology and knows what is important for a production like the Tour de Suisse. "opticalCON® fiber optic connector systems give our customers maximum flexibility. This allows risks to be precisely distributed as necessary."
Both the fact that the opticalCON® MTP®24 worked perfectly across the entire Tour de Suisse and did not suffer any damage, as well as the fact that since the opticalCON® MTP®24 has been used in tough broadcasting, no cleaning has been necessary, are reasons for Martin Sturzenegger to smile. Robust and less fragile cables mean less work and more time for him – but also lower maintenance expenses and manageable costs.



The precise fit of the connectors allows easy use of the opticalCON® fiber optic connector system: "The fact that the push-pull connector modules fit perfectly is one of our core competences."
The Tour de Suisse 2017 is now over for Martin Sturzenegger. Once again, he has successfully met all of the challenges over the course of the nine days. There was no complete failure, his team was always able to provide an excellent image selection and everything went according to plan for the tpc experts. He will be involved with the Tour de Suisse in 2018 again. Getting his equipment ready. Connecting the broadcasting van. Capturing the combined force of the emotions. And amazing millions of people watching.

NEUTRIK

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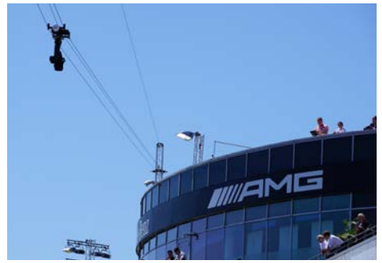
tpc BROADCAST AND BEYOND

The ADAC Zurich Nürburgring 24h Race

Every year on a weekend in May over 150 cars will race the ADAC Zurich 24h of Nürburgring on the combined Nordschleife and Grand Prix track.

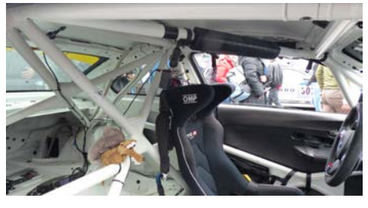
Cars range from the SP9 GT3 class (from which the winner is expected), to a humble Golf GTI and an Opel Manta. The top cars the past couple of years have been Porsche 911 variants, the Audi R8, Mercedes SLS, and BMW Z4. New this year was the Bentley Continental, with two cars from Bentley Motorsport. Notably absent is the McLaren 12c, which qualified well last year but failed to finish due to reliability and accidents this year.



Ongoing media expansion

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.
The ADAC Zurich team created the perfect setting for the race, which every year draws over 200,000 enthusiastic fans to the "Green Hell", with sponsorship packages, hospitality facilities, on-site corporate events, and much more.

TV Skyline's fundamental and ongoing task as the host broadcaster was to continue the expansion and development of the internationally renowned motor racing spectacle, staged for the 45th time in 2017. Alongside a number of firsts in the TV production operation was the integration of 10 onboard cameras, three live drones, a 260m long cable camera 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.



The International Feed

For the production of the internationales feed TV Skyline installed more than 100 km of cable to connect the 33 cameras on the track with the broadcast compound. In addition to the 260m long cable camera running above the start/finish track and the pit lane five 40m high camera platforms were established on motorised steiger around the race course to provide best of bread images. Finally these camera signals were supported by a Helicam which TV Skyline has hired in from HD Skycam. The Helicoper was in the air more than 16h and delivered some of the stunning images of the overhaul manoeuvres.

In the pit lane three wireless cameras captured the action also during the night hours. The camera signals were supported by 106 shotgun microphones around the 25,3km long track. All camera and audio signals were received at the main OB truck, TV Skylines Ü8, which was supported by two satellite OBVans managing some of the cameras on the track self-sufficient and delivering signals via fibre cable to the main OB truck Ü8.
TV Skylines Ü8 also received the signals from the 10 onboard cameras and integrated the live signals from the three drones including intercom via separate stage boxes. A separate slomo production with access to all camera signals completed the setup. About 220 technicians, camera operators, slomo and highlight editors, directors and production staff were on duty in a 3-shift operation during the weekend. A separate installation crew was on duty since Monday before the race weekend installing the camera platforms and laying out the 100km of cable.
In addition to the production of the international feed TV Skyline's Ü8 realised with its second production area the feed for Eurosport including a separate highlight edit and race summery as well as two commentator positions.

The RTL NITRO Feed

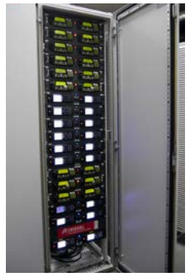
Also the RTL Nitro feed was provided by TV Skyline by the use of the _wige HD ONE truck. This was a national TV program, allowing motorsport fans to follow the event live for more than 26 hours and enjoy the thrills on the racetrack continuously. With a live-cast of 26h and 20min RTL NITRO set a new world record for the longest live transmission. This was 30min more than the world record RTL NITRO had set up in 2016 at the 24h at the Nürburgring.

1x OB truck for the production of the RTL NITRO feed with the _wige HD ONE truck

3x networked non-linear editing desks in combination with the EVS in the OB truck.

2x EVS LSM desks for Highlights and playbacks

2x wireless cameras at the Nürburgring and 1x wireless camera at the Formula 1 Grand Prix in Monaco.

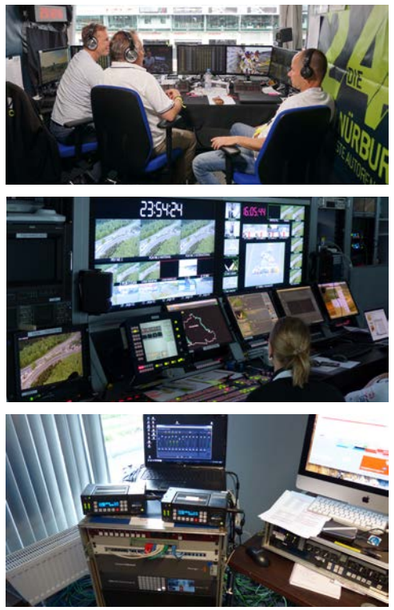


Wireless microphones for two commentators in the pit lane.

1x commentator position with two mini remote cameras.

3x integration of talent positions in the fan areas (Brünnchen, Schwalbenschwanz, Hatzenbach. Intercom, wireless microphones, wireless cameras via stage boxes.

All the Intercom for the race officials at Nürburgring and for the TV Skyline team was provided by Riedel.



The Vodafone Livestream

In parallel a 4G|LTE livestream for Vodafone was provided, allowing motorsport fans all over the world to follow the event for more than 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 on the track. Well-known presenters and six professional motorsport commentators explained and illuminated the event for German and English-speaking viewers.
A total of 1.4 million people accessed the Vodafone Youtube channel to follow the event live from home and at trackside.

And the Winner is ...

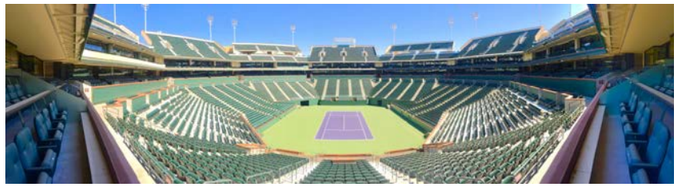
Fourth victory in five calendar years: After 2012, 2014 and 2015, the overall victory in 2017 once again went to the Audi R8 LMS. This makes the race car from Audi Sport customer racing the most successful sports car since 2012, at which time the GT3 models first started battling it out for the overall race win in the Eifel.

Indian Wells Tennis Garden selects RTS and Electro-Voice audio products for Stadium 1 upgrade

Located in Palm Desert, California within Coachella Valley, Indian Wells Tennis Garden is a mecca of the sport, boasting 29 regulation tennis courts, including 9 in stadium configurations

At 16,100 seats, Stadium 1 is its main venue, ranking as the second-largest tennis-dedicated stadium in the world. Indian Wells is the host to the annual BNP Paribas Open, a prestigious two-week professional tournament on the ATP World Tour. The sprawling Indian Wells grounds are also used for numerous other live events, such as music and arts festivals, major concert events and graduation ceremonies for area schools.

Constantly evolving under the ownership of Oracle founder Larry Ellison, Indian Wells Tennis Garden recently rebuilt and refurbished its Stadium 1, including a complete audio makeover that features premium products from two Bosch brands: RTS and Electro-Voice. Technicomm Industries, an area firm that has handled previous Indian Wells expansions and upgrades, was contracted to handle the upgrade.
"They decided to totally refurbish the main stadium, which started in summer of 2016. One major audio goal of that change was to modernize the intercom system," says Steve Burgess, project manager for Technicomm. "We wanted a system that could become part of our site-wide Dante audio network, and our research showed that RTS was one of the few brands with that capability."
Burgess contacted his regional RTS representative to arrange a demo. Upon experiencing the system's capabilities, Indian Wells and Technicomm agreed it was the smart choice. Operating as part of Indian Wells' existing Dante matrix system would create great flexibility, enabling both in-house and external communications. In addition, it would enable Technicomm to address another need by eliminating equipment clutter in the broadcast booths.



"Over the years, the broadcast booths, which are quite small, had built up a variety of equipment to meet communication needs, including multiple radios, cell phones, and a computer," notes Burgess. "It had reached a point where is actually impeded operations. By integrating everything together in a Dante network, the RTS system eliminated a ton of gear from the booths while meeting every need. That made a lot of people very happy." The intercom system is based on an RTS ADAM-M digital matrix and utilizes OMNEO IP technology as its networking backbone. A total of 15 RTS DKP-4016 desktop keypanels and one rack-mount RTS KP-5032 keypanel are spread throughout the sprawling Indian Wells facility, each fitted with either a MCP-90-12 gooseneck microphone or PH-88 lightweight headset mic. Dante is a digital networking protocol developed by Audinate, allowing both audio and control information to coexist, offering centralized monitoring and control.

"The programmability of the RTS intercom system put us miles ahead of our previous capabilities," says Burgess. "We were able to route several Dante audio streams into the system and tailored each keypanel to what that operator needs on it. We were even able to incorporate the audio stream for the Hawk-Eye line judging system, which was a huge advantage for the broadcast team."

The Hawk-Eye system visually tracks ball trajectory via video and is used to adjudicate disputed out-of-bounds calls in professional tennis events, including the PNB Paribas Open. In addition to video, the system requires audio input from the court effects and umpire microphones to help the computer-based system confirm the precise location where the ball hit the court. Previously, Indian Wells provided those inputs with the help of an outboard mixer – another piece of extraneous equipment.

"Having a Dante network with RTS keypanels changed all that," says Burgess. "Now we use the speaker on the keypanel as the playback device. To add that input into the Hawk-Eye system, all we had to do was go into our Dante controller, drag the source channels over to the destination and the routing was done. Very simple, very easy to use and accurate. It's a good example of the flexibility of a Dante-based system. It also eliminated a whole bunch of gear out of the broadcast booth, which was another goal of ours." Another benefit of the RTS system's OMNEO IP technology was interfacing with the broadcast team that descends upon Indian Wells for the BNP Paribas Open. The equipment supply company, Gearhouse, utilizes another intercom brand, but with the RTS Dante network in place, interfacing the two systems proved to be a simple matter. "The big advantage is that the broadcast team now has full access to the 16 keypanels stations that we have spread throughout the facility," notes Steve Burgess. "That allows the TV producer up in the broadcast booth to communicate with each location, including all four courts used for televised matches, all without requiring any additional hardware."

The public address system was another key part of the Indian Wells upgrade, with both indoor and outdoor areas of the facility being addressed. When Technicomm learned that the Bosch family of brands included Electro-Voice, they were invited to be part of a shootout among six major brands. Electro-Voice provided samples from its EVID line of ceiling-mount and wall-mount loudspeakers. "Our loudspeaker demo comparison was based primarily on sound quality. Cost was not a factor, and there was no thought given to company loyalty. We simply wanted the best," explains Burgess. "For both indoor and outdoor applications, Electro-Voice speakers won definitively on sound quality. We were also taken with the distinctive look of the EVID outdoor speakers." Part of the Electro-Voice EVID line, the PC 6.2 ceiling speaker is a two-way, high output design with wide high frequency dispersion to ensure complete room coverage. Indian Wells installed a total of 62 of these for distributed sound across many of the facility's premium areas, including the owner Larry Ellison's private suite, along with other viewing suites, the champions' lobby, and fitness center. For outdoor public address, the compact, flexible EVID 4.2 was chosen. With a pleasing elliptical shape and EV's proprietary Strong-Arm Mount for easy installation and aiming, the 4.2 features exception full-range fidelity and exceptional intelligibility in a weather-resistant ABS enclosure, with magnetically shielded elements to ensure no conflicts with roving video cameras.

A total of 58 EVID 4.2 units provide distributed coverage for outdoor patios and public areas throughout Indian Wells.

One final audio addition made amid the rebuilding of the stadium was a change to the microphones used in the player interview room after each match. "Just before the tournament, I was talking with one of the engineers from Gearhouse, the broadcast equipment supplier. He asked if he could try a different interview microphone. I'm always up for trying new gear, so I agreed. So he pulled out an Electro-Voice RE50B and we had a little shootout right on the spot. It's a rugged, $150 reporter's microphone that's been around for years. I didn't expect much, but it sounded great – very smooth, clear and consistent at any angle. I was very impressed, so we made the change on the spot. Indian Wells now has three of them, and our post-match interviews sound better than ever."

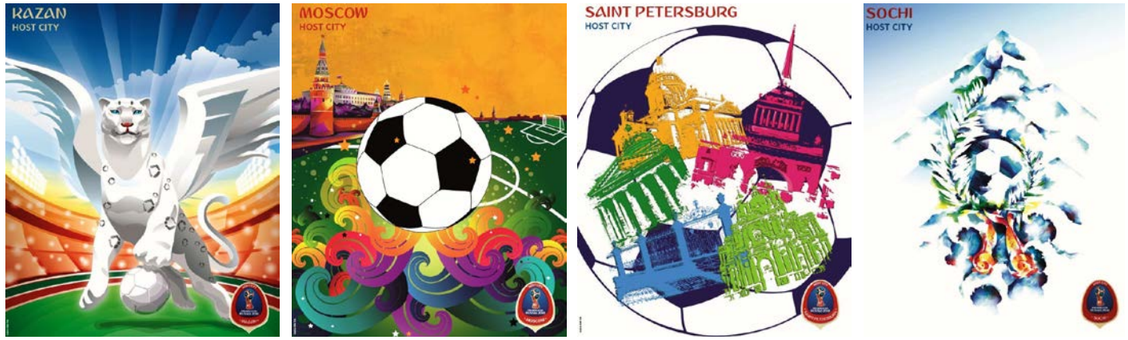
Due to delays in the physical construction process, completing the audio installation at Indian Wells before the 2017 BNP Paribas Open was a major challenge for Technicomm. "We were joking that we needed more Bosch power tools, because we were basically working right up through the start of the tournament," says Burgess. "We took the precaution of connecting and testing everything outside the audio cage before we deployed it.

Fortunately, a team from RTS was on site, helping us program the system and interfacing it with the Gearhouse broadcast intercom so that when we put the gear out in the field, it worked right the first time. RTS helped ensure we were fully operational when the tournament began, and we really appreciated their high level of factory support." By adding RTS intercoms and EV loudspeakers to the Dante-based system they had in place, Indian Wells now has the flexibility to provide the audio and communications for any type of live event, with scalability to simplify future expansion.

"History tells us that there will be ongoing enhancements at Indian Wells," says Steve Burgess. "In fact, we're already in the process of planning to expand our RTS installation with their new ROAMEO wireless intercom product, which will seamlessly expand our capabilities even further. That kind of flexibility will prove useful across the full range of activities they host, including concerts and festivals. We couldn't be happier with our equipment choices."

FIFA CONFEDERATIONS CUP IN RUSSIA

From 17 June to 2 July 2017, the six continental champions joined the Russian hosts and the 2014 FIFA World Cup™ winners Germany for this star-studded tournament.



The FIFA Confederations Cup took place in Russia for the first time, with the host country and Copa América champions Chile making their debuts in the competition. Australia and Mexico, who won the tournament in 1999, had both already qualified. The tournament was completed with Cameroon, Portugal and New Zealand and was played in the four host cities Kazan, Moscow, Sochi and Saint Petersburg where also the IBC (International Broadcast Centre) was located.

The IBC was operated by HBS (Host Broadcast Services). At each FIFA event, HBS works closely with all stakeholders to ensure the facilities at each venue and in the event's International Broadcast Centre are of the highest standard, and then broadcast the matches via the Rights Holding Broadcasters (RHBs) to a global audience. The department also provided TV-related services to all relevant stakeholders on site.

Specialist Cameras in all Four Locations

HBS has selected TV Skyline to support the production of the international feed with the installation and operation of various speciality cameras in all four venues and at the IBC. In the arenas in Moscow, Kazan, Sochi and Saint Petersburg TV Skyline's Gentle:Mote was installed to deliver the tactical shot, the In:Goal camera set consisting of 2x HD:1200 with improved In:Goal fixing, 2x QUBE:CAM which could be booked by RHBs for their commentators via the HBS office and finally a QUBE:CAM II for the press conferences in Moscow, Kazan and Sochi on Match Day -1.

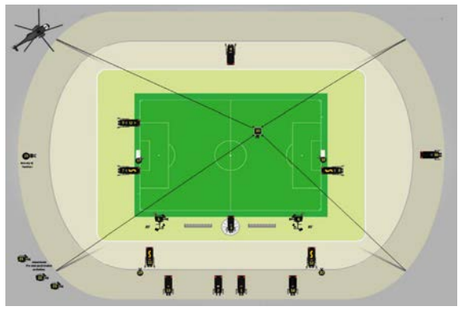
In addition the venue in Saint Petersburg was equipped with a tunnel camera (QUBE:CAM II), an arena beauty shot camera (IOI IO4K) and an outdoor beauty shot camera with remote head and Domo Tactical Solo 7 wireless connection to the OB-Van. In total, there were 26 camera systems operated by TV Skyline with a team of nine technicians.

The cameras at the press conferences in Moscow, Kazan and Sochi were operated remotely from the IBC in Saint Petersburg. The camera signals arrived with embedded audio via a fibre link while the control signals were sent via an IP connection.

TV Skylines Ü7 at the Stadium in Moscow

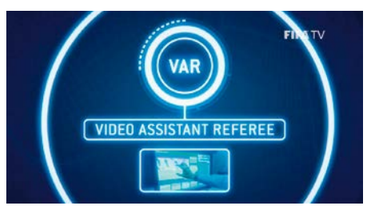
To cover the matches in Moscow HBS has selected the Ü7 OB Truck of TV Skyline to produce the international signal in 1080p50 and 1080i50 with an audio mix in Dolby 5.1 and Stereo. On 9 June a first TV Skyline team of six technicians was sent to Moscow to set up the cabling for the 24 camera production. In addition to signals from a Spidercam, a Helicam and the In:Goal cameras TV Skyline's Ü7 received signals from 10x Ikegami HDK-970A and HDK-97A cameras, 3x Grass Valley LDX Compact C80 cameras (2x Steadicam wireless) as well as from 4x Grass Valley LDX-86 cameras operated in 3-times slow motion mode.

The signals were recorded for live replay on seven networked EVS XT3 HD servers including an EVS IPDirector. A 19 people strong technical team from TV Skyline was on location in Moscow from 12 June to 4 July and produced the international signals for the matches on 18 June, 21 June, 25 June and 1 July.



The Test of the Video Assistant Referee (VAR) System

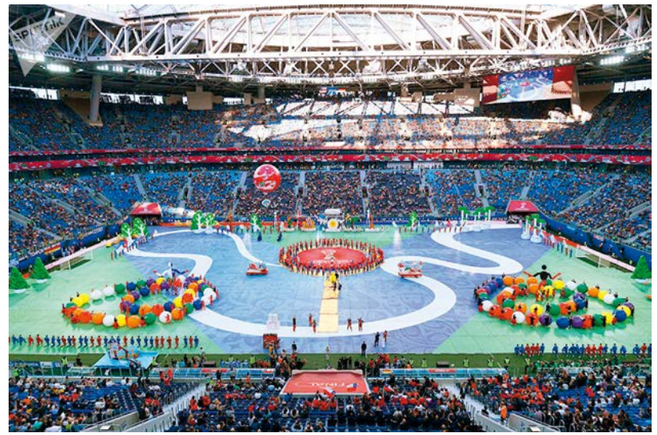
Speaking before the final, Fifa president Gianni Infantino said the VAR system has been a "great success", but that work was needed on "the details" such as the speed of decisions. "Without VAR, we would have had a different tournament and it would have been a little less fair," he added. "Thanks to VAR, we have achieved a great thing: Big mistakes will not happen any longer."
09
"It will always be the referee who decides and there will always be discussions, but big mistakes will be corrected and that is a great achievement after it was asked for so many years." Fifa's head referee Busacca admitted "many aspects should be improved" in the VAR system until next year.
"Every referee team in every country that is supplying officials to the World Cup needs to be working with VAR every day," he said. "In five days, we did the VAR training for this competition. To implement more, to be at the level we need, we need time."



The Confederations Cup Final 2017

Football fans heading to the stadium in Saint Petersburg on Sunday 2 July were looking forward to an exciting FIFA Confederations Cup 2017 Final between Chile and Germany, but the prelude was set to be no less memorable. At 19:15 local time, the Closing Ceremony of this year's tournament of champions highlighted the beautiful city of Saint Petersburg, honouring previous winners of the tournament and featuring two-time FIFA World Cup winner Ronaldo. The clock tower on the Peter and Paul Fortress begun the spectacle by sending the audience back in time to 1897, when the Venice of the North was at the heart of the golden age of ballet in the country. Russian icon Nikolay Tsiskaridze, rector of the Vaganova Academy of Russian Ballet, was lending his unique expertise for this section.

The entire ceremony was inspired by the idea of a carnival procession, when one act quickly is followed up by another. Almost 1,500 people were involved – performers, musicians and dancers from different cities – and spectators were treated to a mix of classic and modern dance, pantomime, circus acts and hip hop.
Football also played an important role in the spectacle, as enormous footballer puppets representing the countries that had won previous editions of the tournament were paraded on the stage.
After that, one of the most famous players ever to win the Confederations Cup, FIFA legend and two-time FIFA World Cup™ winner Ronaldo, brought the coveted winners' trophy out into the stadium.



"I am delighted to be back at the Confederations Cup," said Ronaldo, who won the 1997 edition in Saudi Arabia. "But, more importantly, it is great to come back to Russia and to see everything working so well with the tournament. I have no doubt that the country will organise an incredible World Cup next year."
After the ceremony Germany battled their way to the 2017 FIFA Confederations Cup title by beating Chile 1-0 in a tight final. Lars Stindl gave the Germans a first-half lead against the run of play, taking advantage of some dreadful defending. Chile went close on several occasions after the break, but their top stars faltered in front of goal.

ARENA TELEVISION LTD.

LIVE PORTRAIT

Arena OBX-Y-Z

OB Truck

General Contact

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RH1 5JY
United Kingdom

Peter Love

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peter.love@arena-tv.com
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In an industry dominated by multinationals, Arena is proud to be British and pay all taxes in the UK

Arena holds contracts with the nation's major broadcasters to provide coverage of events, music, large studio shows and sport. Arena is a Telegraph 1000 business that has remained in continuous family ownership for approaching 30 years. Arena continues to pioneer by introducing the world's first IP-based UHD High Dynamic Range OB fleet. The new triple-expands (OBX, Y & Z) all feature UHD/HD/SD multicast technology. They are based around a powerful IP core developed in association with Grass Valley and Cisco. This approach is much more flexible than traditional baseband.

Production Area in OBZ

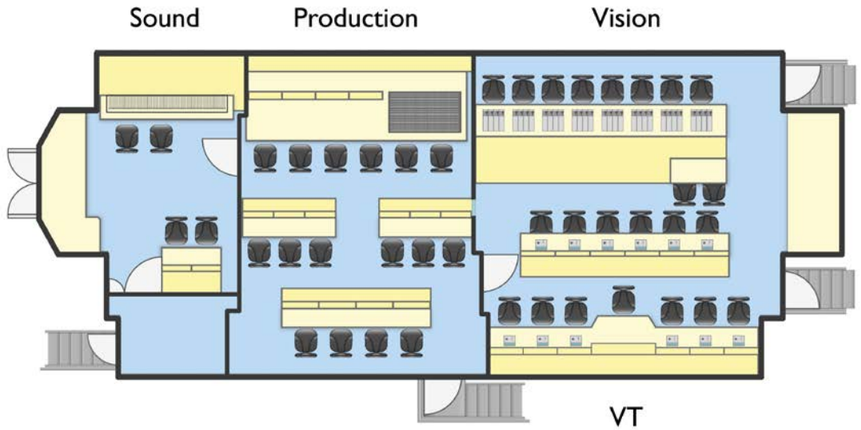
Jamie Oakford Match Director Premier League in OBX

Mark Cattell mixing Dolby Atmos in OBX

Grass Valley LDX-86N Cameras on Premier League

Jib and Sky Cart

Cisco Fibre Patch



ARENA

Equipment Specifications of three Arena OBX-Y-Z Trucks
Tripple Expando: 15,7m Long, 4,0m High, 2,55m Wide – Expands to 6,2m
Shifts between 4K/UHD+HDR | Super SloMo | 1080p | 1080i | 720p

TECHNICAL SYNOPSIS

Arena OBX-Y-Z

OB Truck

Video

- 32 Grass Valley LDX-86N UHD (Fiber)
- 32 Grass Valley XCUs (Fiber)
- 8 Super SloMo Cameras Grass Valley/Sony/I-MOVIX
- Lenses from Canon, UJ86, UJ90, CJ12, CJ20
- Heavy Duty Tripods from Vinten
- Vision Mixer: Grass Valley HD/4K Kayenne K-Frame Switcher
- 14 Panasonic Monitors with Multi-Viewer (200+ images can be displayed)
- Grass Valley Kaleido KMX Multivieer/Splitter
- Character Generator: As requested by Clients
- Monitors in Camera Shading Area from Sony & Canon
- 12 EVS XT3/XT4K 12 Ch Full Editing Replay Servers
- UHD SloMo/ SuperSloMo Devices from EVS and Grass Valley (up to 12)
- Digital Glue from Axon
- No Video Matrix: This is an IP truck so all data flows everywhere without a standard matrix using GV Nodes and a Cisco datacentre switch

Audio

- Audio Mixer: Calrec Apollo (64 fader)
- No Audio Router: This is an IP truck so all data flows everywhere without a standard matrix using GV Nodes and a Cisco datacentre switch
- Audio Monitoring: Genelec, 5.1 Surround Sound with Dolby Atmos
- Audio Measurment: Dolby/Calrec
- Audio Multi-track: As requested by Clients
- Microphones from Sennheiser, beyerdynamic

Intercom/Communication

- Matrix: Riedel Artist

System Integrator

videlio

Special Features

These three OB units are the first large-scale implementation of a native IP work flow capable of multi-casting in UHD HDR, UHD SDR, HD and SD. Data is fully IP from the camera CCU through the vision mixer to transmission. This makes the truck considerable more capable than the existing baseband approach that uses 4 copper cables for each path.

- IP maintains and enhances the high production standards of an HD workflow
- No bottlenecks associated with legacy baseband Quad-HD designs
- Supports both GV's (and Sony's) native UHD cameras
- A base-band Quad-HD layer for legacy and back-up purposes
- Scalable on-site and off-site remote production as standard
- Multi-format HDR as standard; upgradeable to 4K high frame rates and 8K
- New outboard fibre-nod technology reduces cable rigging time and costs
- Highly scalable allowing requirements to change on the day
- Cisco 10GbE and 40GbE switch; SPMTE 2022-6 with TR03/04 support
- UHD 2Si for significant benefits in resilience and monitoring

EUROMEDIA A21

LIVE PORTRAIT

A21

OB Truck

General Contact

EUROMEDIA

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Xavier Devreker
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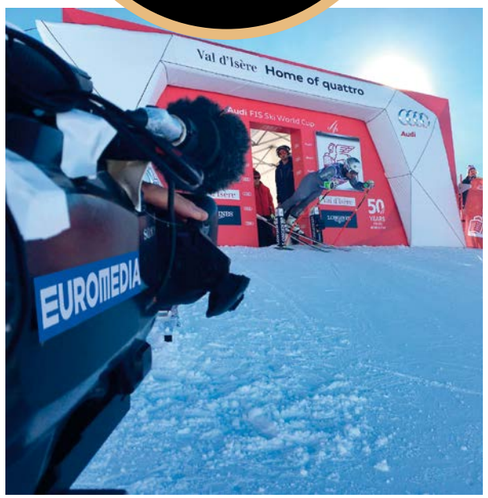


In France and Internationally, EUROMEDIA covers all technical aspects of the production process, from filming through to broadcasting.

Thanks to its expertise and extensive resources, EUROMEDIA has the capacity to broadcast daily sporting events, shows and TV programmes. EUROMEDIA is constantly working on broadening its technical innovations know-how in order to assist its clients in creating the television experience of the future.

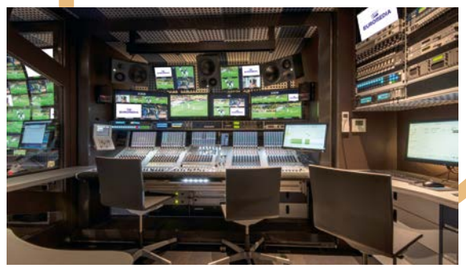
Production Area

Vision Mixer and Monitor Wall

SloMo Desk

Production Area 2

EUROMEDIA



Sound Area

Camera Shading

LIVE PORTRAIT

A21

OB Truck

Equipment Specifications EUROMEDIA A21
Double Expando: 14m Long, 4m High, 2,50m Wide – Expands to 5,5m
Shifts between 4K/UHD+HDR |
Super SloMo | 1080p | 1080i | 720p

EUROMEDIA

Video

- UHD: 16 Sony HDC-4300 4K/UHD/SSM Cameras
- HD: A combination of 30 Sony Cameras HDC 2400, HDC 4300, HDC 1500R
- Wireless Camera Adapters: Livetools HD RUNNERIII / TRACER III
- Cable Connectors: Lemo 3T and Lemo 3K SMPTE
- Lenses from Canon and Fujinon
- Heavy Duty Tripods from Vinten
- Vision Mixer: Grass Valley K-Frame 9 M/E with Kayenne Panel 5M/E and Kayenne Pannel 2M/E
- Character Generator: on demand
- Monitors in the Production Area 23x Vutrix Quad 24" / 1x 24" UHD
- Multiviewer/Splitter from Evertz: VIP
- Monitors Camera Shading Area from NEC 6x OLED, 6x LCD 21"
- 16 Slots for VTs and EVS available
- 10 – 22 Ch HD EVS XT3 or 12 Ch UHD
- 10Gb, 3Gbs SDTI, and GigE Network
- Digital Glue from SAM
- Video Controller: Lawo VSM
- Video Matrix: SAM Sirius 840 552 x 692 + SAM Vega 96 ports
- Network: Network architecture Avaya Gigabit / Network Cisco Fiber 10 Gigabit for 4K
- KVM Devices: BlackBox
- Measurement: Tektronix WFM-5000/5200, WVR-8200

Audio

- Audio Mixer: Studer Vista X, Core400 (50 Faders)
- Audio Matrix: SAM Sirius 3504 x 2736 EMBEDED/MADI/AES
- RTW TM7 Audio Scope
- Audio Monitoring: Neumann KH:310A, KH:120, 810G 5.1 Surround Sound
- Audio Multi-track: PC with MADI card RME: software Reaper
- Microphones from Sennheiser, Neumann, Schoeps
- AudioEffects: TC Electronics M2000, DB4
- Measurement: RTW TM7 (with multichannel, BLITS, LU

Intercom/Communication

- Matrix: RTS ADAM-M 120 x 120, Analog + OMNEO + MADI
- Wireless Talkback: Motorola, Wisycom (Overline on demand)
- AETA HifiScoop Digital Telephone Interfaces

Coach Builder

- TTK, Design by Project Builders

System Integrator

EUROMEDIA

EUROMEDIA B40

LIVE PORTRAIT

B40

OB Truck

General Contact

EUROMEDIA

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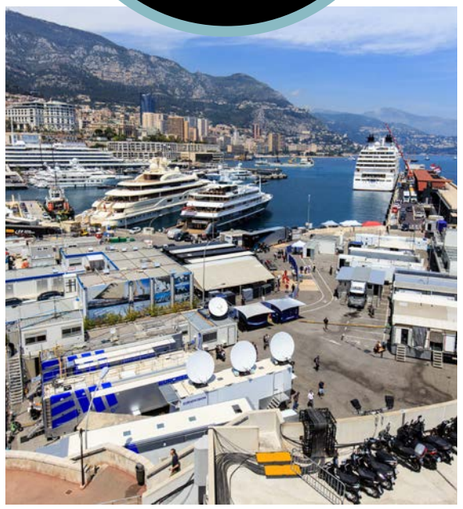
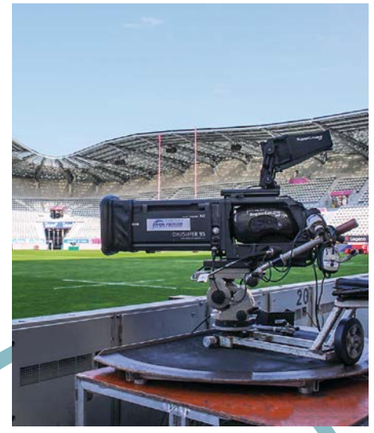


In France and Internationally, EUROMEDIA covers all technical aspects of the production process, from filming through to broadcasting.

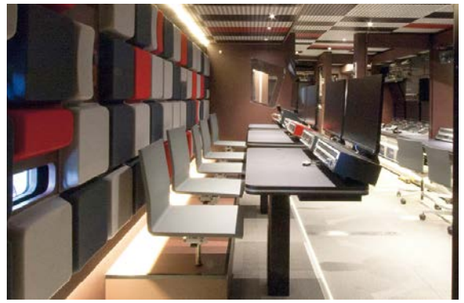
Thanks to its expertise and extensive resources, EUROMEDIA has the capacity to broadcast daily sporting events, shows and TV programmes. EUROMEDIA is constantly working on broadening its technical innovations know-how in order to assist its clients in creating the television experience of the future.

Production Area

SuperLoupe Camera



SloMo Desk

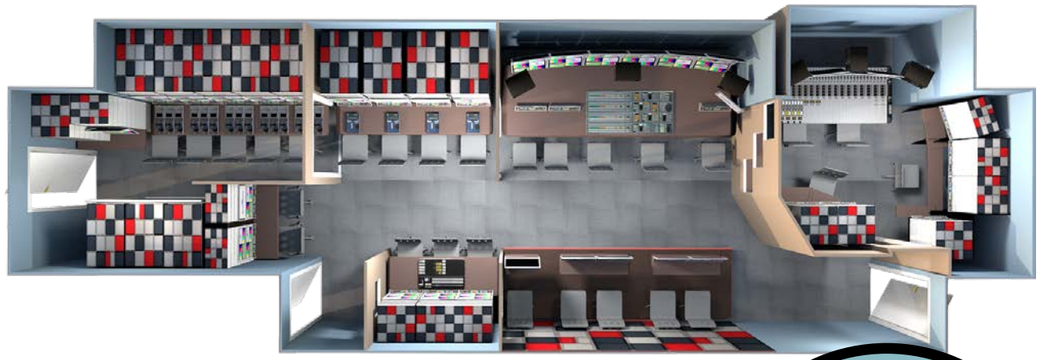


Sound Area

EUROMEDIA

Inside View

Camera Shading



EUROMEDIA

Equipment Specifications EUROMEDIA B40
Double Expando: 18m Long, 4m High, 2,55m Wide – Expands to 4,6m
Shifts between 4K/UHD+HDR | Super SloMo | 1080p | 1080i | 720p

TECHNICAL SYNOPSIS

B40

OB Truck

Video

- 24x Sony HD Cameras (HDC-2400, HDC-4300, HDC-1500R) or 18x Sony UHD Cameras (HDC-4300)
- SuperSloMo Cameras: SuperLoupe 4K and HDC-4800
- Wireless Camera Adapters: Livetools HD RUNNER III / HD TRACER III
- Cable Connectors: Lemo Triax, , Lemo SMPTE Fiber
- Lenses from Canon HD: 14x, 17x, 21x, 86x, 100x
- Lenses from Canon UHD: 12x, 20x, 90x
- Lenses from Fujinon UHD: 13x, 22x, 80x
- Tripods from Vinten
- Vision Mixer: Grass Valley K-Frame 9 M/E
- Video Processor: 9 M/E max with 6 Keyers / ME
- With Kayenne Panel 5 M/E and Kayenne Panel 2 M/E
- Character Generator: on Demand
- Monitors in Production Area: 23x Vutrix 24" / 1x 24" UHD
- Multiviewer/Splitter Evertz VIP, HD or 3G
- Network : Network architecture Avaya Gogabit / Network Cisco Fiber 10 Gigabit for 4K
- Monitors in Camera Shading Area: 5x Sony BVM OLED, 5x NEC LCD Multisync
- 17 Slots for VTRs and Servers EVS XT3 12ch are available
- 10Gb, 3Gbs SDTI, and GigE Network
- Digital Glue from SAM,
- Video Controller: Lawo VSM
- Video Matrix: SAM Sirius 840 552 x 668
- KVM Devices: BlackBox
- Measurement: Tektronix WFM-5200, WVR-8200

Audio

- Audio Mixer: Studer Vista 9 (52 Faders)
- Audio Matrix: SAM 3120 x 1968 EMBEDED/MADI/AES
- RTW TM7 Audio Scope with BLITs, LU
- Audio Monitoring, 5.1 Surround Sound: Neumann KH:310A + 120 + 810
- Audio Multi-Track: PC with Madi card RME Card (MADI)
- Microphones from Sennheiser, Neumann, Schoeps (on demand)
- AudioEffects: TC Electronics M2000, M6000, DB4

Intercom/Communication

- Matrix: RTS ADAM-M 128 x 128 (64 Analog + 32 OMNEO + 32MADI),
- Wireless Talkback: Motorola, Overline, Riedel
- Hifiscoop AETA ISDN Codecs

Coach Builder

- Toutenkamion

System Integrator

EUROMEDIA

EXPRESS

LIVE PORTRAIT

Express OB 8o8

OB Truck

General Contact

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Japan

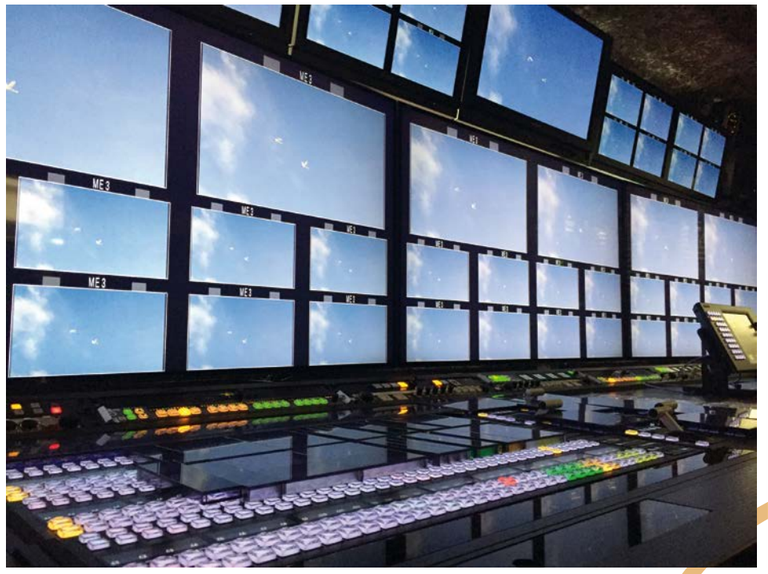
Jun Otaki

Tel: +81 (06)6315-3183

jun-otaki@express.co.jp
http://www.express.co.jp/

A truly flexible company

Express aims to become a truly flexible company to accommodate a client's needs by maximizing our ability to create a variety of video production that we have established for over 20 years in the areas including program production, news reporting technology, live broadcast of sports and concerts, commercial production, program offering, movie production, publishing, internet distribution, application development, hydroponics, etc.



Production Area

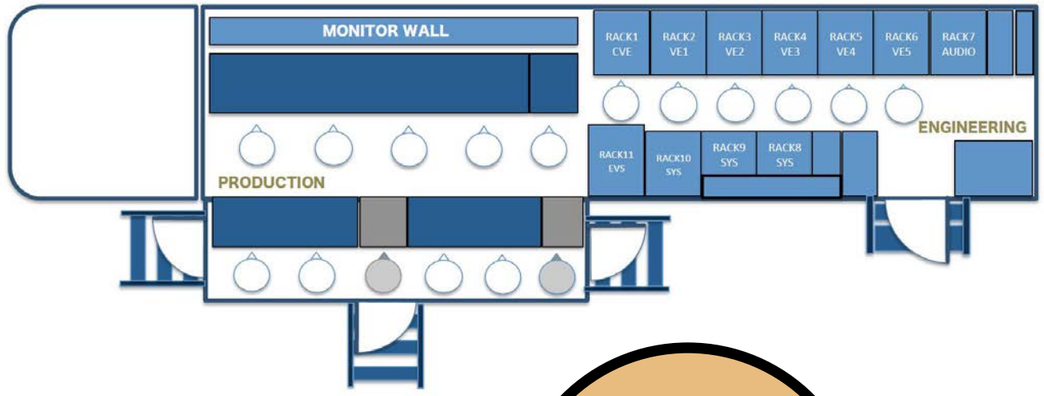
Intercom

Sound Area in second Truck

SloMo/Replay Area

Image Creation & Information Services
Express

Camera Shading Area



LIVE PORTRAIT

Express OB 808

OB Truck

Image Creation & Information Services **Express**

Equipment Specifications Express OB 808
Single Expando: 10,2m Long, 3,6m High, 2,5m Wide – Expands to 3,5m
Shifts between UHD + SDR | Super SloMo | 1080p | 1080i | 720p
SMPTE 2110 and SMPTE 2022 Standards Supported

Video

Sony HDC-4300 4K/UHD/SSM Bi-Motion Cameras, HDC-1100, HDC-1600
Lenses from Fujinon and Canon
Heavy Duty Tripods from Vinten and Shotoku
Sony Vision Mixer XVS-8000
Sony BVM-X300, PVM-A250 and KJ-55X9300D Production Monitors
Sony BVM-X300, BVM-F170, PVM-A170 Monitors for Camera Shading
Character Generator: Videotron SG-70V
Sync Generator: Leader LT4610
EVS XT4K and XT3 Production Servers
10Gb, 3Gbs SDTI, and GigE Network
System Control: Sony
Sony VTRs HDW-M2000 and PMW-50
Video Matrix from FOR.A MFR-8000 (256x256) and MFR-5000 (128x128)
Multiviewer from FOR.A MV4200 and Videotron DDA-70V
KVM Devices from Fujitsu: FS-8008MM
Measurment Equipment: Leader LV5490 and LV 5770A

Audio *(is located in separate Audio Truck)*

Audio Mixer: SSL SL-4048G+BG
Audio Matrix: Sony IXS-6700 48x68(AES) 48x64(Analog)
Audio Monitoring: PMC 1B1S
Audio Effects: Yamaha SPX990, Lexicon 300L, Gate Drawmer DS-201
Audio Recording: Sony PCM-7040 and MDS-E55
Audio Measurement: Astrodesign AM-3803
Microphones from Sennheiser, Shure, AKG, Schoeps, Sanken, Sony

Intercom/Communication

Matrix: Riedel Artist 64x64

System Integrator

SONY

FUJI MEDIA TECH

LIVE PORTRAIT

FR4K

OB Truck

General Contact

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sales_dpt@fuji-mt.co.jp
http://www.fuji-mt.co.jp/en

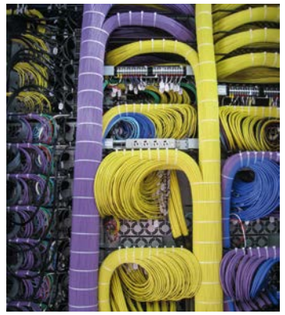
Fuji Media taped the Japanese event of the World Wrestling Entertainment with two broadcast TV trucks and Mobile Audio Units including 11 cameras, 12 VTR and 2 LSM.

Also the television show, "I Survived A Japanese Game Show," was covered by Fuji Media (including Camera X 10, VTR X 6 and Jib X2) at TOHO studio for 3 weeks, as well as managing the technical aspects of the show contestants' living arrangements on location. From the Roppongi Hills Arena Fuji Media delivered the SPIDERMAN 3 World Premiere with two broadcast TV trucks and Mobile Audio Units including 13 cameras, 10 VTR and 2 LSM.

Production Area

Production Area

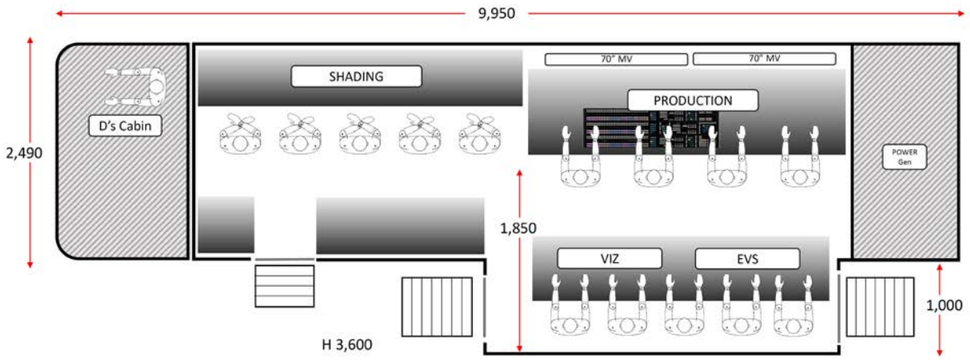
SloMo/Replay Area

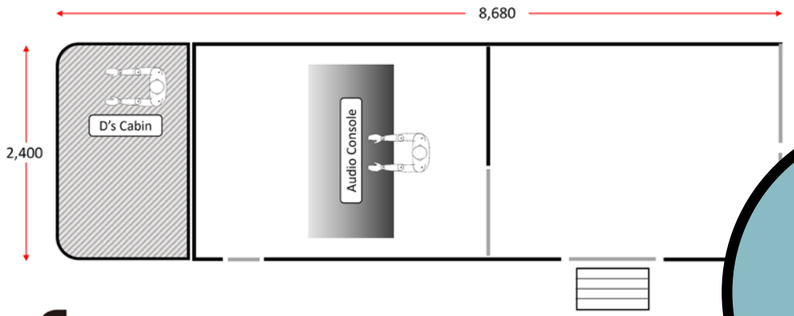


Cabeling of the Racks

Camera Shading Area

Sound Area in second truck





TECHNICAL SYNOPSIS

FR4K

OB Truck

fmt
FUJI MEDIA TECHNOLOGY, INC.

Equipment Specifications Fuji Media FR4K
Single Expando: 9,95m Long, 3,6m High, 2,5m Wide – Expands to 3,5m
Shifts between 4K/UHD+HDR + SDR | Super SloMo | 1080p | 1080i | 720p
SMPTE 2110 and SMPTE 2022 Standards Supported

Video

- Sony HDC-4300 4K/UHD/SSM Bi-Motion Cameras, HDC-3300
- Lenses from Fujinon
- Heavy Duty Tripods from Shotoku
- Sony Vision Mixer XVS-8000
- Sharp 70" Production Monitors with FOR.A MV-4300 4K Multi-Viewer
- Sony BVM-X300 Monitors for Camera Shading
- Character Generator from Vizrt
- EVS XT4K with EVS XFile 3
- 10Gb, 3Gbs SDTI, and GigE Network
- System Control: Sony
- Sony VTRs XDS-PD2000
- Video Matrix from FOR.A MFR-8000 (256x256)
- Multiviewer from FOR.A MV4300
- Measurment Equipment: Leader LV5490 and LV 5770A

Audio (is set in separate FA4 support truck prior to each event)

- Audio Mixer: Tamura NT660, 30 Faders and 6 Layers
- The Mixer supports 2 Stage Boxes 48/8 analogue and 56/8 and analogue
- Audio Matrix: FOR.A MFR8000
- Audio Monitoring: Genelec 8240
- Audio Effects: TC Electronics M6000
- Audio Multi Track Recording: Avid ProTools 64ch
- Microphones from Sennheiser, Shure, Sanken, etc.

Intercom/Communication

- Matrix: Clear-Com Eclipse HX_Median 64x64

System Integrator

SONY

GEARHOUSE BROADCAST

LIVE PORTRAIT

Columbus

OB Truck

General Contact

Gearhouse Broadcast LLC

9440 Chivers Ave
Sun Valley
CA 91352

Marc Genin
Managing Director

Tel: +1 818 955 9449
Fax: +1 818 955 9779

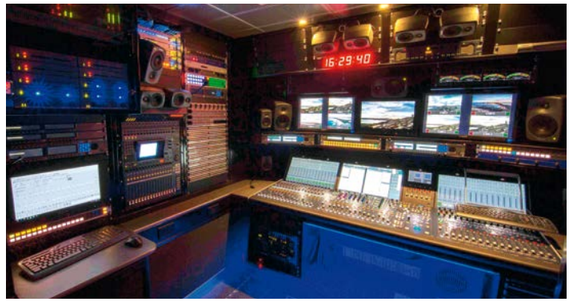
sales@gearhousebroadcast.us
http://www.gearhousebroadcast.com/usa

Gearhouse Broadcast USA is located in Los Angeles and offers services in Outside Broadcast, Project Solutions, Systems Integration, Event Communications, Equipment Rental and Equipment Sales.

Gearhouse Broadcast USA has built on its global reputation for supplying high-end 4K/UHD and HD equipment to a wide range of Broadcasters, Studios, Networks and Production Companies throughout the US. We pride ourselves on our highly experienced engineering staff who possess the latest product knowledge and offer our clients 24 hour technical support.
Whether a complete end-to-end production system or a stand-alone kit rental, Gearhouse Broadcast USA delivers the best and most reliable service our industry can offer. Our fleet of mobile units work on major sports events, music concerts, news and current affairs, entertainment shows, studio productions and reality television shows.

Production Area

Vision Mixer



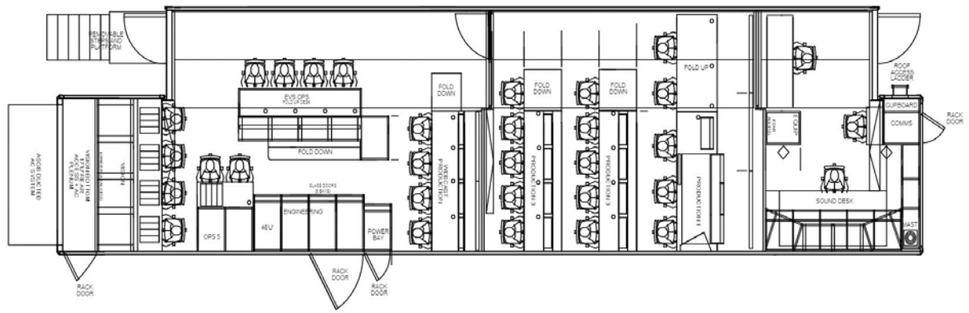
Sound Area

Engineering Area

GEARHOUSE BROADCAST

Replay Area

Camera Shading



LIVE
PORTRAIT

Columbus

OB Truck

GEARHOUSE BROADCAST

Equipment Specifications Gearhouse Broadcast Columbus
Single Expando: 16,1m Long, 4,3m High, 2,6m Wide – Expands to 5,8m
Shifts between 4K/UHD+HDR | Super SloMo | 1080p | 1080i | 720p

Video

22x Sony HDC-4300 or Hitachi SK-1200 Cameras plus 10x POV
Up to 6 RF cameras supported by an onboard 50' telescopic mast
Lenses available from Canon and Fujinon
Vision Mixer: Grass Valley K Frame 128in/48out
Character Generator: Chyron HyperX^3 or VizRT
24x 24" 4K Monitors in Production Area from Boland
10x 24" Monitors in Middle and Rear Desk from Ikegami
2x 50" Monitors in 2nd Production Area from Sony
2x 50" Monitors in EVS Replay Area from Sony
Replay and record: 4x 12 Channel EVS ChannelMax fully optioned live production servers with 4K capability, XFILE 3, IPD3, HD/SSD ISOs
Conversion: 32 framesync/de-embed/color correctable external inputs
12x up/down/cross converters (4K and HD)
10Gb, 3Gbs SDTI, and GigE Network
Routing Matrix: Imagine Communications Platinum IP3 with 460 x 720 HD SDI I/O, 45x multiviewers,18x MADI inputs and 22x MADI outputs
Full Lawo VSM control system allowing operators to assign/re-assign audio and video sources

Audio

Audio Mixer: Lawo mc^{2}56 MK2, 48 faders wide with 12 layers = 576 faders
Audio Matrix: Lawo Nova Core, fully redundant, 4096 routable Inputs and Outputs
64 x AES Input/Output Pairs, 6 x DSP cards 560 Inputs/120 Outputs, 40 x MADI Ports. 8 for external connections, 4 x Ravenna Ports AES/67 Ready
Audio Monitoring: Genelec, 5.1 Surround Sound
Microphones from Sennheiser, Crown and Sony

Intercom/Communication (4 Wire)

Matrix: RTS ADAM - with MADI and RVOn interfaces
Clearcom Freespeak 2, with 20 point to point (fully assignable) beltpacks

External I/O (Throwdown field/stage boxes)

3x Lawo Dallis boxes with 32 Mic/Line Inputs, 16 Line Outputs, 8 AES Input/Output Pairs
1x Andiamo MC/Dallis with 32 Mic/Line Inputs, 32 Line Outputs
1x Andiamo XT with 16 AES Input/output Pairs, 32 Line Inputs/Outputs

Power Required

CAMLOK 2x 208 v 3 phase 125A plus service to SNG (100A)

GH ONE TV

LIVE PORTRAIT

GH ONE

OB Truck

General Contact

GH ONE TV

Platinum Place Complex
Accra
Ghana

http://ghonetv.com/

ARET video and audio engineering

Dr. Eng. Alessandro Bechstein
Tel: +39 02 9227 0873
a.bechstein@aret-engineering.com

www.aret-engineering.com

GH One TV is Ghana's fastest growing television channel, transmitting a wide range of current affairs, entertainment and lifestyle content.

Since it started broadcasting three years ago, the station has carved a strong niche in the Ghanaian audience by capturing a unique viewership profile whose television preference rests mainly in those three specific genres. Last year GH One rolled out support for Ultra HD following an upgrade of its studio and outside broadcast facilities in Accra. Delivering the studio install and then the OB truck build represents one of the biggest broadcast projects ever undertaken in Ghana. Because of the enormous variety of content that GH One produces, from live sports to news gathering, through to on-location interviews and shows, the single biggest challenge was designing an outside broadcast system that could adapt to cope with all of those requirements.

Camera Shading Area

Production Area

Vision Mixer

Equipment Racks

SloMo/Replay Area

Sound Area

Audio Mixer

TECHNICAL SYNOPSIS

GH ONE

OB Truck

Equipment Specifications GH ONE
Single Expando: 14m Long, 4m High, 2,5m Wide – Expands to 4,8m
HD/4K solution based on 12G-SDI

Video

- Cameras: Panasonic AK-UC300 and Sony BRC-H900 HD PTZ
- Lenses from Fujinon
- Wireless Camera Adapters: SWIT S-4904T/R RX/TX
- Heavy Duty Tripods from Cartoni
- Blackmagic Design Vision Switcher ATEM 2 M/E
- Philips LED FullHD 49" und 42" Monitors in Production
- Philips LED FullHD 42" and 32" Monitors in Camera Shading
- Blackmagic Design Multiviewers
- Character Generator. AXEL CGLive and AXEL DLGPlus
- SlowMotion with NewTek 3Play 425
- Record/Replay with YouPlay Servers and Blackmagic Design HyperDeck
- DigitalGlue Products from Blackmagic Design
- Video Matrix from Blackmagic Design 40x40, 72x72, 12x12
- Blackbox USB/DVI KVM Switcher
- Measurment Equipment: Blackmagic Design SmartScope

Audio

- Audio Mixer: Yamaha CL5 + 3 Dante Extensions and Behringer X32 Rack
- Audio Matrix: ADC Audio Patch Panels – Internal Yamaha Routing
- Audio Monitoring: Genelec
- Audio Effects: Falcon Three SDI Audio Processor
- Microphones from Sennheiser

Intercom/Communication

- Matrix: RTS ZEUS III with 13 Remote Stations Talk-Back. TELEX TR700-A2

System Integrator

- Axel Technology/Aret Engineering

HD RESOURCES

LIVE PORTRAIT

HDR HD13

OB Truck

General Contact

HD Resources Sweden AB

Hangövägen 18
115 41 Stockholm
Sweden

Per de Navarro
Technical Director

Tel: +46 8 715 1913

per@hdresources.se
www.hdresources.se

HD13 is the latest truck delivered to HDR

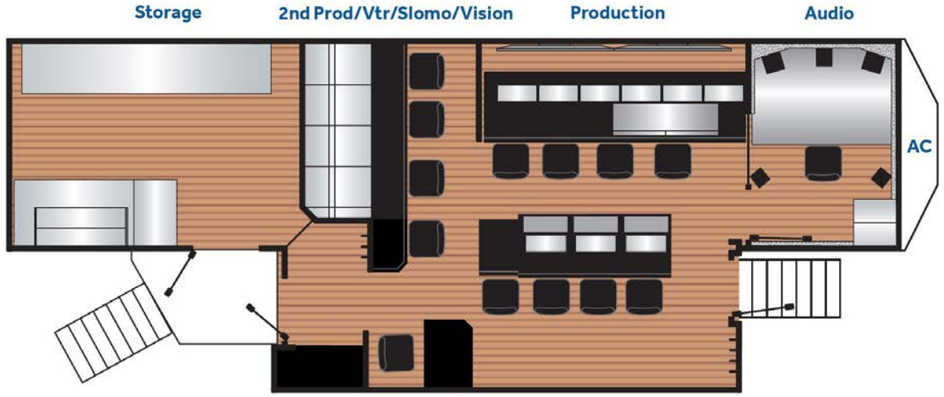
It is the tenth to be provided by Sony and was turned around in record time, with initial contract to delivery completed in less than 3 months. Sony offered the customer a one-stop shop for the strategic project, working together with external System Integrators to provide a full solution and ensure total confidence and peace of mind for HDR. The 4K truck supplied for HDR continues the ongoing relationship between the media centre and Sony. The truck is an evolution of the HD trucks provided last year, future proofing the company by allowing for 4K OB capability. Technology included in the truck includes an XVS-7000 Switcher and a number of Sony monitors, as well as third party technology.

Production Area

Sound Area

Monitor Wall

Camera Shading



LIVE PORTRAIT

HDR HD13

OB Truck

Equipment Specifications HRD HD13
Single Expando: 11,5m Long, 4,m High, 2,5m Wide – Expands to 4,0m

Video

16x Sony HDC-4300 and HDC-2500 Multiformat Cameras
Sony PMW-F55 with CA-4000 and Sony BRC-X1000
Lenses from Fujinon and Canon
Tripods from Vinten, Sachtler
Vision Mixer: Sony XVS-7000with 3ME ICP-X7000 Production Panel
Multiviewer: Riedel MicroN
Character Generator: on Request
XT3 4K/HD Recording/Replay Devices from EVS
VTRs: Sony HDCAM SR / HDCAM / XDCAM
Digital Glue: Riedel, Axon
System Control: Lawo VSM
Video Matrix: Riedel 180 x 180
Measurement Equipment: Tektronix WFM 5200

Audio

Audio Mixer: Lawo mc²56 MKII (16+16c+16)
Audio Matrix: Compact Core
(16x MADI SFP, 3xDSP)
Audio Effects:
TC Electronics 6000, 4000, 3000, D-TWO
Audio Monitoring: Genelec 5.1
Dolby-E Enc/Dec, Dolby Digital Enc/Dec
Audio Measurement: RTW TouchMonitor TM9
Microphones from Sennheiser + Neumann
Stageboxes
with Riedel MediorNet Compact Pro

Intercom/Communication

Matrix: Riedel Artist 64 x 64
Wireless Talkback Equipment from Riedel
and Motorola

System Integrator

SONY

HESSISCHER RUNDFUNK

LIVE PORTRAIT

HR FÜ2

OB Truck

General Contact

Hessischer Rundfunk

Bertramstraße 8
60011 Frankfurt
Germany

Joachim Jacob

Tel: +49 69 155 2982

joachim.jacob@hr.de
http://www.hr.de/index.html

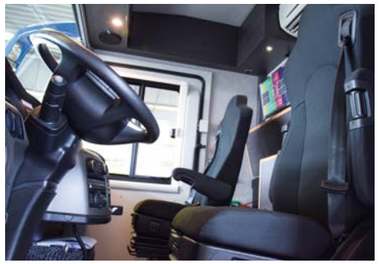
The Hessische Rundfunk (hr), regional broadcaster of the ARD with headquarters in Frankfurt and regional studios in Wiesbaden and Kassel, uses a fleet of ten TV and Radio OB vans for producing entertainment, sports and concert events all over Hessen.

The newly developed OB van is a 4-camera vehicle with own satellite uplink system. By that, the „FÜ 2“ is capable of producing content and broadcasting signals via satellite at the same time. The challenge in building the „FÜ 2“ was adhering to the given dimensions of the vehicle and to fit all the necessary workplaces and workflows inside. Basis for the vehicle is the MAN chassis TGM 15.250 4x2LL which was modified by the coach builder. The construction uses a sandwich structure and had to combine the benefits of a camper with the demands of an OB van. The complete interior work was done by BFE.
The final solution houses four rooms with eight workplaces.
Room 1 is the central apparatus room (CAR) with 3 19“ racks. The room has a separate A/C system and is soundproof so the neighboring workplaces are not affected by any noise.
Room 2 is the control room, installed lengthwise, with five workplaces.
Room 3 is the audio control room with one workplace. If necessary another workplace can be added. The audio control room is acoustically separated from the central control room.
Room 4 is the driver's cab which houses two multi-purpose workplaces. This room uses the benefits usually associated with campers (available space / separate doors).

Production Area (left)

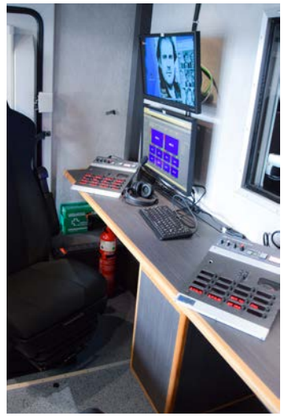
Production Area (right)

Audio Workstation

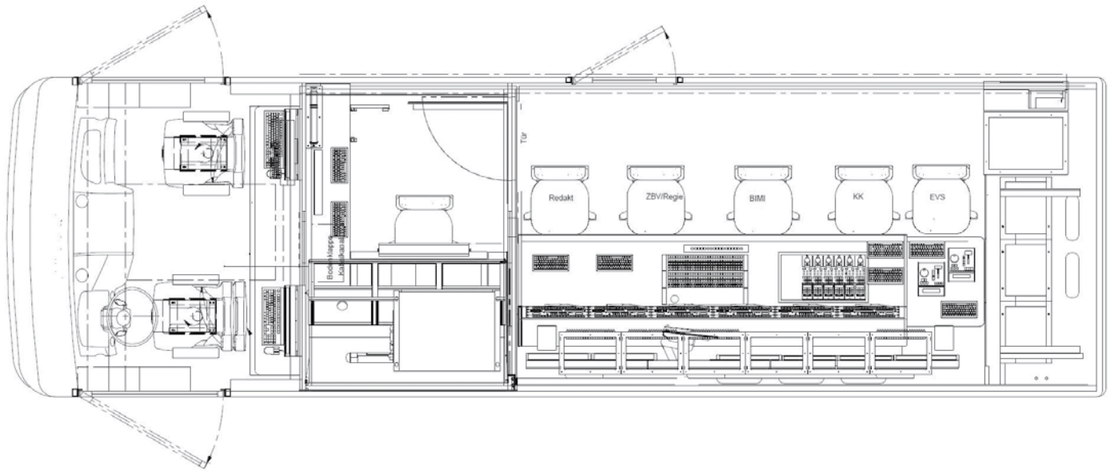


Drivers Cabin

Satellite Uplink System



Modified Drivers Cabin



TECHNICAL SYNOPSIS

HR FÜ2

OB Truck

Equipment Specifications HR FÜ2
8,5m Long, 3,95m High, 2,54m Wide – Total Weight max: 15

Video

- 4x Grass Valley LDK 86 / 1x Grass Valley LDK 800
- Sony MVS-3000 Vision Mixer
- Sony / sonoVTS Production Monitors
- Character Generator: Caspar
- Record/Replay Slomo with EVS XT3 / XFile
- VTRs Sony XDS-PD2000 / Panasonic AJ-HPS1500
- Digital Glue: Lynx 5000 / Lawo Vpro_8
- System Control: BFE KSC Core
- Clock: Plura / SPT UDD25
- KVM Matrix: G&D DVICenter DP32
- Measurment Equipment: Tektronix WVR8300
- IT Infrastructure: Cisco WSC 3850

Audio

- Audio Mixer: Lawo mc²36
- Audio Effects: Yamaha SPX
- Audio Monitoring: Genelec 1030/1029
- Audio Processing: Samplitude Audioworkstation
- Microphones from Sennheiser

Intercom/Communication

- Matrix: Riedel Artist 64x 64
- Wireless Talkback: Clear-Com Freespeak II
- ISDN Codec: AVT Magic

SAT Technology

- KU Band: Sat Mission SMP155
- HPA: CPI 400W Amplifier (redundant)
- KA Band: Dawson GC Zero 70 KA Band Sat System
- HF: DVB-S Reception with Fibre LNB by KA Sat System

System Integration

BFE Studio und Medien Systeme

LEVIRA

LIVE PORTRAIT

Levira HD3

OB Truck

General Contact

Levira

Kloostrimetsa tee 58a
15026 Tallinn
Estonia

Kulno Kägu
Head of TV Production

Tel: +372 680 4006

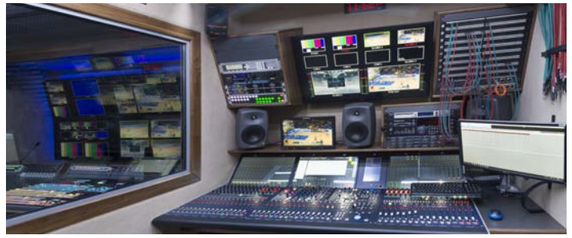
kulno.kagu@levira.ee
www.levira.ee

Levira is one of the largest TV play-out service providers in Northern Europe and the largest Outside Broadcast service provider in Baltic's.

Levira has three HD OB trucks and UAV (drone) for live TV production. Levira's customers include multinational and regional IT companies and broadcasters like Turner, Sony, MTG, EBU, ERR, Discovery, ATEA, A-Data, TeliaSonera, Tele2, Elisa, Starman, TV3.

Main Production

Sound Area

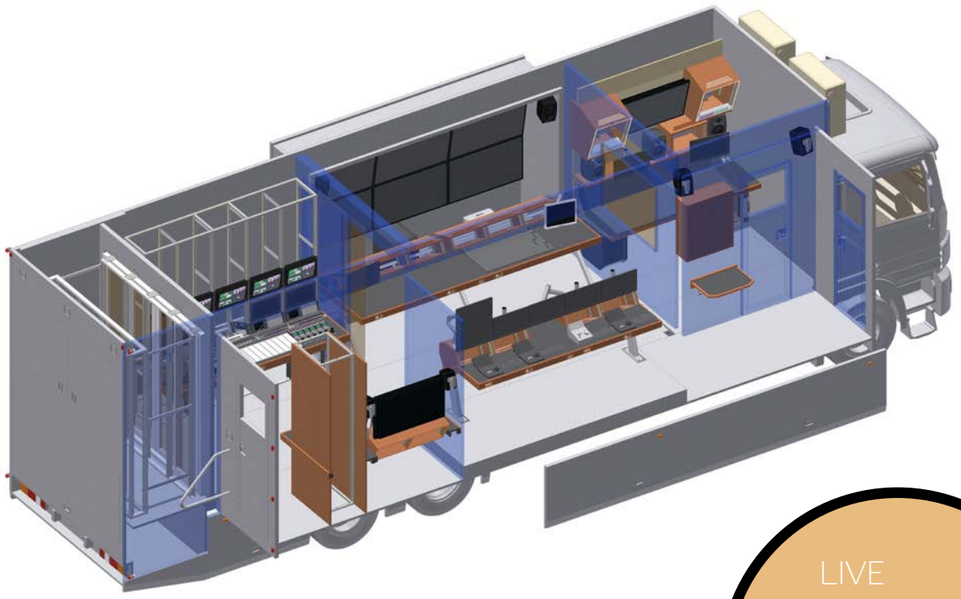


Replay Area

Camera Shading Area

Inside View

Secondary Production



LIVE PORTRAIT

Levira HD3

OB Truck

levira

Equipment Specifications Levira HD3
Double Expando: 12m Long, 4,4m High, 2,5m Wide – Expands to 4,8m

Video

- 16x Grass Valley LDX 80 Flex with Fiber XCU Elite
- Lenses from Fujinon and Canon
- Heavy Duty Tripods from Vinten, Cartoni, Sachtler
- Vision Mixer: Ross Carbonite Black 3 M/E
- 6x TV Logic LHM-460A Monitors in Production Area
- Multiviewer: Imagine Communications Platinum SX Pro
- Monitors for Camera Shading: Sony PVM-A170, TV Logic LQM-171W
- Character Generator: Caspar CG, INTV Atlas Sport Graphics System
- Recording/Replay Devices from EVS, BLT and Grass Valley
- VTRs: Up to six Recording devices are possible
- Digital Glue: Imagine Communications
- System Control: Lawo VSM
- Video Matrix: Imagine Communications Platinum 256x216
- KVM: G&D 32 Ports Matrix
- Measurement Equipment: Imagine Communications TVM9150PKG and TVM-4DG

Audio

- Audio Mixer: Lawo mc²56 MKII (16+16c+16)
- Audio Matrix: Lawo Nova73
- Audio Effects: SPX2000
- Audio Monitoring: Dynaudio
- Audio Measurement: RTW TouchMonitor TM9
- Microphones from Sennheiser + Neumann

Intercom/Communication

- Matrix: Riedel Artist 128 x 128
- Wireless Talkback Equipment from Riedel and Motorola
- Commentary Units: Riedel CCP-1116

System Integrator

TVC

MOBILE TV GROUP

LIVE PORTRAIT

MTVG 41 HDX

OB Truck

General Contact

Mobile TV Group

8455 Highfield Parkway
Englewood
CO 80112
United States of America

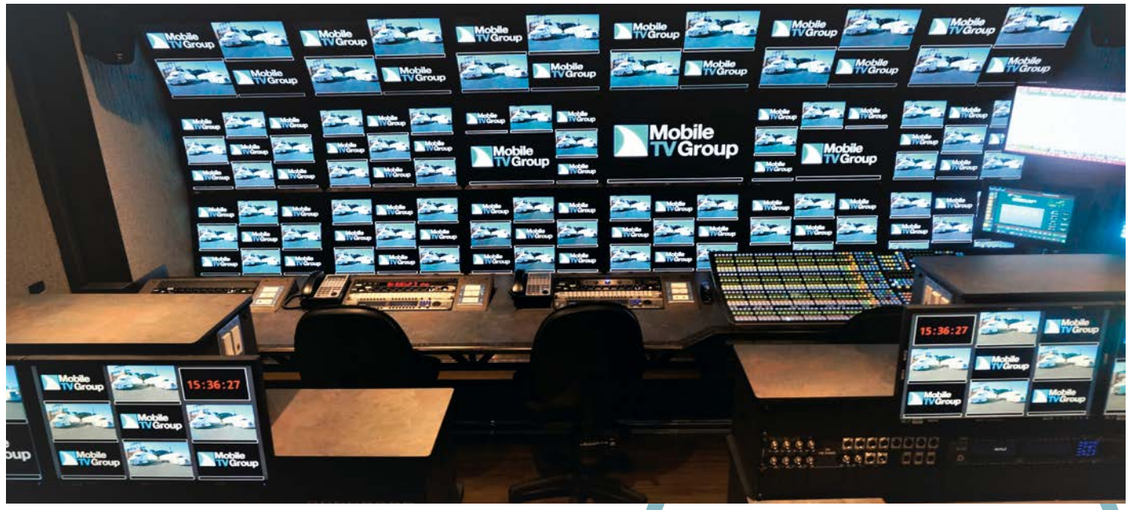
Nick Garvin
Director of Business Development

Tel: +1 720-573-6562

ngarvin@mobiletvgroup.com
www.mobiletvgroup.com

Established in 1994

Mobile TV Group is celebrating its 22nd anniversary with continued dedication to technological innovation, customer service, maintenance, and competitive pricing. The company was initially launched as Mountain Mobile TV (in Colorado), then added Lone Star mobile (in Texas), Western Mobile TV, and eventually combined operations into Mobile TV Group (MTVG). It is privately owned.



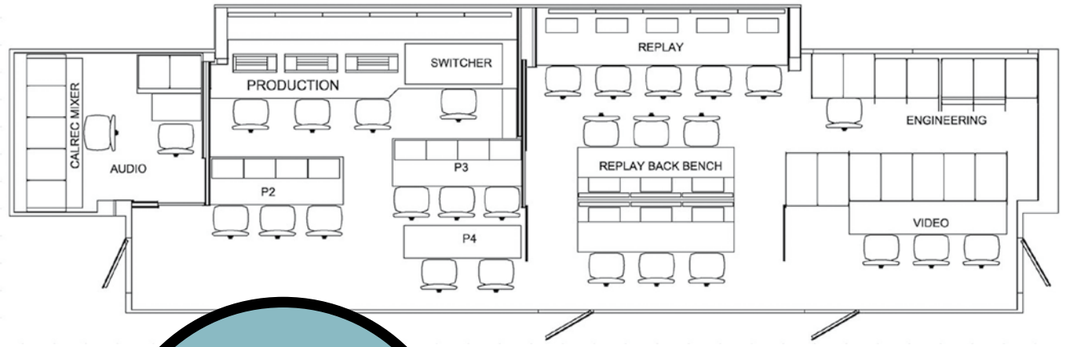
Production Area

Production Switcher

SloMo Desk

Sound Area

Camera Shading Area



LIVE
PORTRAIT

MTVG 41 HDX

OB Truck

Mobile TV Group

Equipment Specifications MTVG 41 HDX
Double Expando: 53' Long, 13'3" High, 8'6" Wide – Expands to 16'6"
Super SloMo | 1080i | 720p

Video

Grass Valley LDX Premier (Triax) and LDX 86 Universe (Fiber) Cameras
SMPTE to Singlemode Converters (SHEDS)
Lenses from Fujinon, ZA22 x 7.6, HA18 x 5.5
Lenses from Canon, XJ95 x 8.6, XJ80 x 8.8, XJ76 x 9
4 HH ENG viewfinders
8 Hard Camera Sleds w/ 7" OLED VF's
Heavy Duty Tripods from Vinten and Mathews
Vision Mixer: Grass Valley HD Kayenne K-Frame Switcher 5M/Es
Up to 132 images in production wall
Character Generator: ChyronHego HyperX³
Monitors in Production Area from Sony
Monitors in Camera Shading Area from Sony
3x EVS XT3 12 Ch Full Editing Replay Servers
One 4 Ch XS3 Server for Spotbox
EVS XFile with USB 3.0 /EVS Epsio FX / EVS C-Cast
10 GBs and 3Gbs SDTI Network
Digital Glue from Evertz and AJA
Video Matrix: Evertz EQX 396 x 712 3G Router

Audio

Audio Mixer: Calrec Artemis 'Beam' Audio Mixer (64 Fader)
256 routable inputs via MADI, 64 analog inputs
Audio Matrix: Evertz EQX 2,752 x 2,848
RTW TM7 Audio Scope
Audio Monitoring: Genelec, 5.1 Surround Sound
Audio Multi-track: Digicart EX w/SD Card Drive
Microphones from Sennheiser, Audio-Technica, Crown and Sony

Intercom/Communication

Matrix: RTS ADAM 64 x 64 w/OMNEO
Studio Technologies IFB System
RTS 4030 IFB Beltpacks
RTS BP325 Headset Boxes
RTS TIF 2000
Telos Hx2 Digital Telephone Interefaces
Two-Way Radios with two Base Stations

Power Required

208 VAC, three phase, 200amps

NEP AUSTRALIA

LIVE
PORTRAIT

HD13

OB Truck

General Contact

NEP Australia

Level 3, 8 Central Avenue
Eveleigh (Sydney)
NSW 2015
Australia

Andy Armstrong
Director of Sales

Tel: +61 2 96908080

aarmstrong@nepinc.com
www.nepinc.com

NEP Australia's President Soames Treffry launches HD13

HD13 and HD14 are the company's third purpose-built 4K outside broadcast vehicles. They are equal in size, technical capabilities and work environment to HD11, which NEP launched in August 2014.

HD13 and HD14 are unmatched by any other mobile production facilities in Australia. They are equipped with Sony's HDC4300 4K and high-speed camera technology, bringing to more than 70 the number of these camera units in NEP's fleet. HD13 and HD14 launched early 2017, ready for the 2017 AFL and NRL seasons, and further enhancing the NEP Australia fleet. Each truck creates 65m2 of internal space, 34 seats, 9 Rec/Replay, 7 CCU, 2 TD/BE, 3 Audio, 13 Production Gallery

Production Area

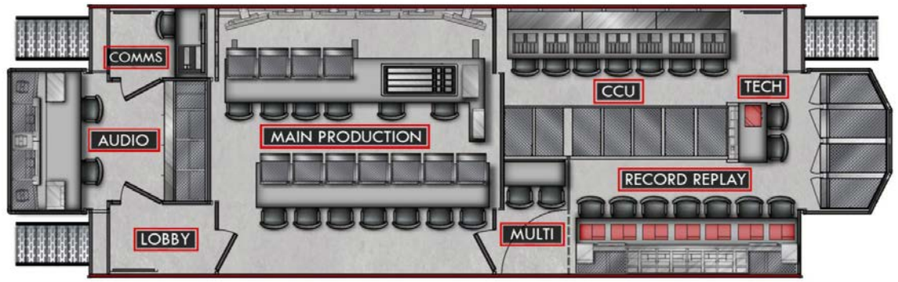
18 x 32" Monitors - all completely configurable

Vision Mixer

Sound Area

SloMo / Replay Area

Camera Shading Area



LIVE
PORTRAIT

HD13

OB Truck

Equipment Specifications NEP Australia HD13
Double Expando: 14,9m Long, 4,3m High, 2,5m Wide – Expands to 4,7m
Shifts between 4K/UHD+HDR | Super SloMo | 1080p | 1080i | 720p

Video

Up to 28 Sony HDC-4300 4K/High Speed & Sony HDC 2400 HD cameras + up to 8 Specialty Sony P1 and Camera Corp Q-Ball POV cameras
2 x Sony PDW 800/XP Link wireless camera systems
Lemo SMPTE Fibre
Lenses from Canon
Heavy Duty Tripods from Vinten and Sachtler
Vision Mixer: Sony XVS-8000X 1080p, 4ME 2nd generation panel
Boland Monitors in production wall Imagine SX Pro Multi-Viewer
Character Generator: ChyronHego Lyric or VizRT available
Monitors in Camera Shading Area from Sony
10x EVS XT3 12 Ch
10Gb, 3Gbs SDTI, and GigE Network
EVS XFile with USB 3.0 + X Hub + IP Director
Digital Glue from Ross, Lawo, Cisco, Riedel
Video Controller: Lawo VSM (Virtual Studio Manager)
Video Matrix: Imagine IP3 Hybrid 504 x 824
KVM Devices: IHSE Draco Tera Compact
Measurement: Tektronix WFM 8300 + WFM 5000

Audio

Audio Mixer: Lawo mc²56 (80 Fader)
Lawo Nova Router and five remote Stage Boxes via fiber
RTW TM7 Audio Scope
Audio Monitoring: Genelec, DSP SAM
Audio Multi-track: Spot On
Microphones from Sennheiser
Audio Effects:
TC Electronics System 6000

Intercom/Communication

Matrix: Riedel Artist 192 x 192
Kenwood Radios
Comrex Hybrid Digital Telephone Interfaces

Coach builder

Smith Great Bentley UK

Coach builder

NEP Australia System Integration Team

NEP NORWAY

LIVE PORTRAIT

UHD9

OB Truck

General Contact

NEP Norway

Økern Torgvei 13
0580 Oslo
Norway

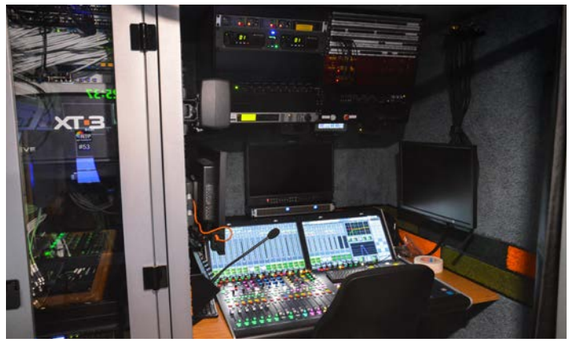
Lise Heidal
Managing Director

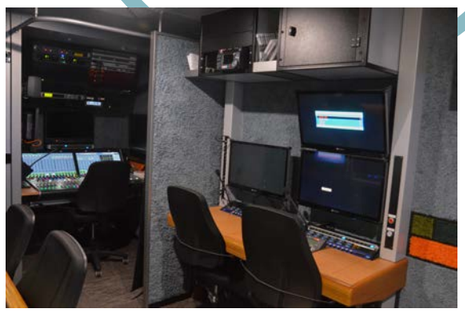
Tel: +47 23 68 80 00

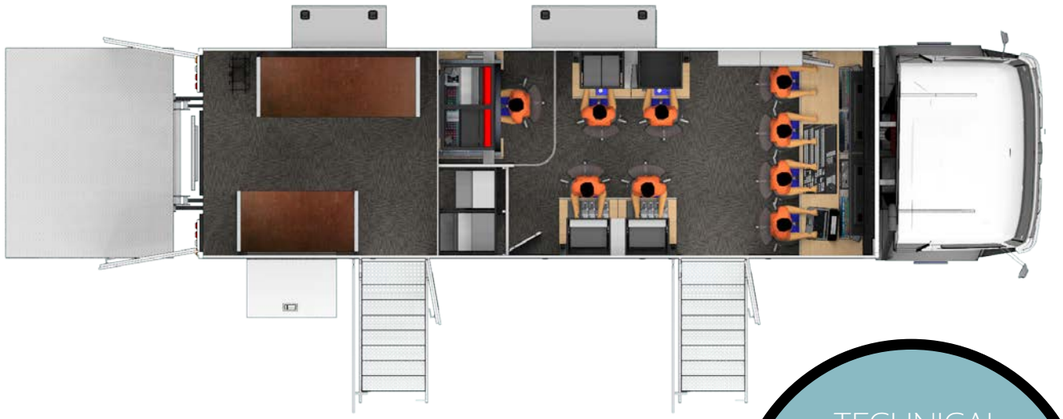
lise.heidal@nepgroup.com
http://nepnorway.com/

The company was established in 1985, and recently changed its name to NEP Norway.

NEP Norway is one of the largest companies within television production, with long-term supply agreements with several of the largest players in media production. NEP Norway has 30 years experience in OB productions. With stringent, high quality deliveries we focus on good processes, logistics, technology and teamwork. We have employees with extensive experience in all key roles and a large resource pool of the country's best freelancers. We exchange technical resources and personnel within the NEP Group. The group disposes of 150 mobile units, of which the largest are doing productions with over 40 cameras. The group's large OB fleet and equipment stock makes NEP able, in a short time, to custom tailor productions in- and outside Norway.







TECHNICAL SYNOPSIS

UHD9

OB Truck

Equipment Specifications NEP Norway UHD9
Box Body: 7,9m Long, 2,3m High, 2,5m Wide
Shifts between 4K/UHD+HDR | Super SloMo | 1080p | 1080i | 720p

Video

6x Grass Valley LDX86 Universe
Connectors: Lemo SMPTE 311 Fiber
Lenses from Canon
Heavy Duty Tripods from Sachtler
Vision Mixer: Grass Valley HD/4K Karrera K-Frame Switcher 3 UHD M/Es
Character Generator: NEP self-built
Monitors in Production Area from Sony 4x 49" and NEC 4x 23"
Monitors in Camera Shading Area from BON 4x 21"
Multiviewer/Splitter: Imagine Platinum SX Pro
Recording Devices: Sony PDW-HD1500 and AJA KiPro Ultra
2x EVS XT3 12 Ch Full Editing Replay Servers
10Gb, 3Gbs SDTI, and GigE Network
Digital Glue from Lynx, Imagine and Riedel (MicroN)
Video Controller: Lawo VSM
Video Matrix: Imagine Platinum 128 x 128
KVM Devices: Guntermann & Drunck
Measurement: Phabrix QX, Leader 5333

Audio

Audio Mixer: Lawo mc²36 (24 Fader)
Audio Matrix: DirectOut 1024 x 1024
RTW TM7 Audio Scope, Sonifex
Audio Monitoring: Genelec, 5.1 Surround Sound
Audio Multi-track: Ableton
Audio Effects: TC-M6000
Microphones from Sennheiser, beyerdynamic, Bartlett
Stagebox with DirectOut Andiamo and EXBOX and Riedel MediorNet

Intercom/Communication

Matrix: Riedel Artist 64 x 64
Riedel/Motorola Radios
AVT Digital Telephone Interfaces

Coach Builder and System Integrator

broadcast SOLUTIONS
www.broadcast-solutions.de

NEP SWITZERLAND

LIVE PORTRAIT

UHD42

OB Truck

General Contact

NEP Switzerland

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8604 Volketswil
Switzerland

Trond Hermansen
CTO

Tel: +41 71 388 00 55

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www.nepswitzerland.ch/

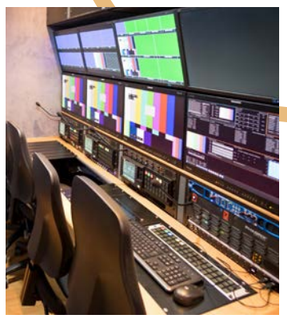
Premiere content producers across the broadcast and live events industries turn to NEP to help them bring entertainment to life.

NEP provides the technology and know-how that enables clients to capture and display productions on any platform around the world. For more than 30 years, NEP has been delivering solutions for remote production, studio production, video display, host broadcasting, post production, and creative technology/IP services that set the global industry standard. With operations around globe, NEP is everywhere you need to be, with the experience and resources to make your broadcast or event a success.

Production Area

Vision Mixer and Monitor Wall

Sound Area



Camera Shading Area

Equipment Racks

SloMo Area

LIVE
PORTRAIT

UHD42

OB Truck

Equipment Specifications NEP Switzerland UHD42
Single Expando: 13,8m Long, 4m High, 2,55m Wide Expands to 4,2m
Shifts between 4K/UHD+HD | Super SloMo | 1080p | 1080i | 720p

Video

- 10x Grass Valley LDX 86N UHD or 16x LDX 86N HD
- Connectors: Lemo SMPTE 311 Fiber
- Lenses from Canon
- Heavy Duty Tripods from Sachtler
- Vision Mixer: Grass Valley Karrera K-Frame Switcher 8 M/E 96in x 48out
- Character Generator: NEP/Digisport, 2x EVS EPSIO
- Monitors in Production 1: 5x 46" NEC, 2x 31" TV Logic UHD
- Monitors in Production 2: 2x 46" NEC, 4x 24" NEC
- Monitors in Camera Shading Area: 4x 24" TVLogic UHD, 4x NEC 24"
- Multiviewer/Splitter: Imagine Platinum SX Pro 64x6 and 3x 32x6
- Recording Devices: Sony PDW-HD1500 and AJA KiPro Ultra
- 4x EVS XT4K 12 Ch Full Editing Replay Servers
- 10Gb, 3Gbs SDTI, and GigE Network
- Digital Glue from Axon, Imagine and Riedel (MicroN)
- Video Controller: Lawo VSM
- Video Matrix: Imagine Platinum 256 x 352
- KVM Devices: Guntermann & Drunck
- Measurement: Phabrix QX, Leader LV 5333

Audio

- Audio Mixer: Lawo mc²56 (48 Faders) and Soundcraft Si Performer 1
- Audio Matrix: Lawo Nova 73 Compact
- Measurement: RTW TM9 Audio Scope and Sonifex
- Audio Monitoring: Genelec, 5.1 Surround Sound
- Audio Stageboxes with DirectOut Andiamo.mc
- Audio Effects: TCM 6000
- Microphones from Sennheiser

Intercom/Communication

- Matrix: Riedel Artist 128 x 128
- Riedel/Motorola Radios
- Riedel MediorNet Stageboxes
- AVT Digital Telephone Interfaces

System Integrator

broadcast SOLUTIONS
www.broadcast-solutions.de

NEP USA

LIVE
PORTRAIT

SSCBS

OB Truck

General Contact

NEP USA

2 Beta Drive
Pittsburgh
PA 15238
United States of America

Mike Werteen
Sales Director

Tel: +1 720-573-6562

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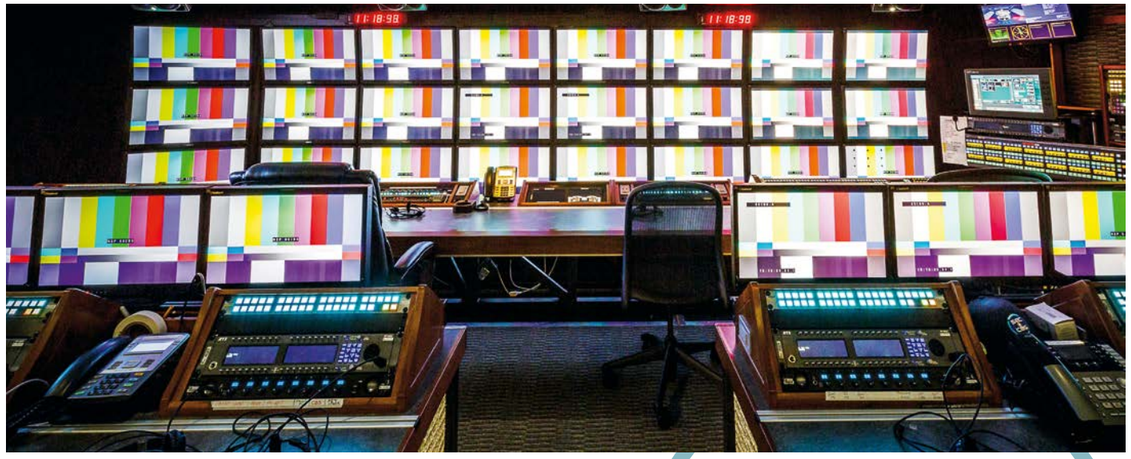
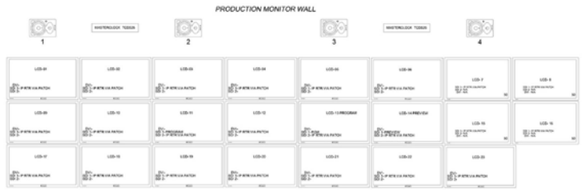
www.nepinc.com

Premier content producers across the broadcast and live events industries turn to NEP to help them bring entertainment to life.

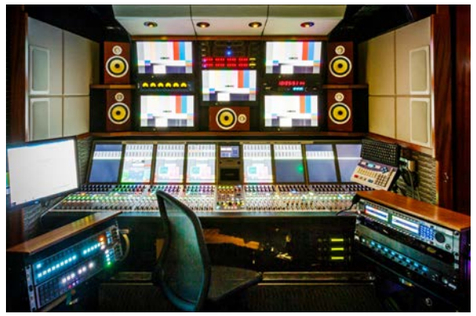
We provide the technology and know-how that enables our clients to capture and display productions on any platform around the world. SSCBS in one of NEP's next generation HD, 4K-capable OBs. Based in the United States, this extremely powerful 4-unit-truck has the space, infrastructure, and flexibility to handle the largest and most complex productions on TV. With operations around the globe, NEP is everywhere you need to be, with the experience and resources to make your broadcast or event a success.

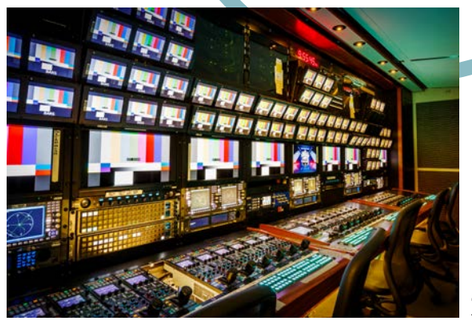


Production Area



Sound Area



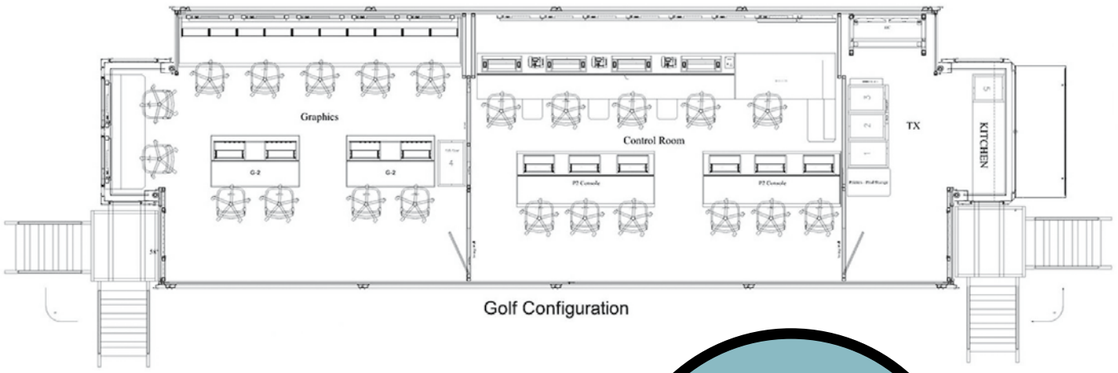


Camera Shading Area

SloMo Area

Equipment Racks

Equipment Racks



Golf Configuration

NEP

Equipment Specifications NEP SSCBS
Double Expando: 64' Long, 13'3" High, 8'6" Wide – Expands to 21'
Super SloMo | 1080i | 720p

TECHNICAL SYNOPSIS

SSCBS

OB Truck

Video

- 14x Sony HDC-2500 Cameras and 7x HDC-4300 Cameras
- Wired for 36 CCUs, 14 BPUs and 6 HDFX
- SMPTE to Triax & SM option HDFX-200
- Lenses from Fujinon
- Heavy Duty Tripods from Vinten and Sachtler
- Vision Mixer: Grass Valley HD Kayenne K-Frame Switcher 5M/Es
- 23 32" Monitors in Production Wall
- Character Generator: upon Request
- 2x EVS XT3 12 Ch and 4x EVS XT3 8 Ch Full Editing Replay Servers
- 1x EVS XT3 6 Ch Server for Spotbox
- 5x Xhub3 for EVS LSM & Spot Box
- 2x EVS XF3 File Transfer System
- 4x EVS IP Director System
- 2x EVS XT/Access
- 10 Gig Network with 40Gig uplink
- 4 VTR-2 HDCam, 1 DVC Pro, 1 SRW5500
- Wired for 25 Recording devices + 1 Spot Box
- Digital Glue from Evertz and AJA
- Video Matrix: Evertz EQX 576 x 540 3G Router

Audio

- Audio Mixer: Calrec Artemis 'Beam'
- Audio Mixer (72 Faders)
- 1020 Channels (at 48kHz) with full signal processing.
- Audio Matrix: Evertz EQX 2,752 x 2,848
- RTW TM7 Audio Scope
- Audio Monitors: B&W Surround Speaker System
- Audio Effects: DBX 160 Compressors, Sequerra Processors
- Audio Multi-track: Digicart E
- Microphones from Sennheiser, Audio-Technica, Sony
- Audio Submix: Calrec Artemis (64 Faders)

Intercom/Communication

- Matrix: RTS ADAM w/OMNEO
- 3 RVON 16-VOIP Cards
- 4 MADI I/O Cards
- 12 Wet RTS TW PL Channels
- 12 Wet RTS IFB Outputs
- RTS TIF 2000

Power Required

- 208 VAC, three phase, 200amps

NVP

LIVE PORTRAIT

NVP OB4K

OB Truck

General Contact

NVP s.r.l.

C/da Gebbia Grande 1B
98068 San Piero Patti (ME)
Italy

Natalino Pintabona
General Manager

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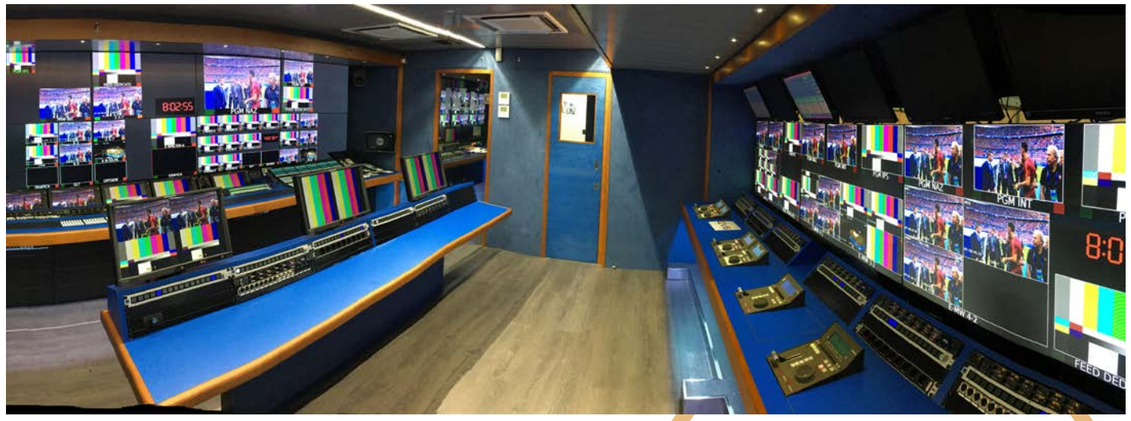
www.nvp.it

Amongst the most technologically advanced production units in Europe

Nataliano Pintabona, Founder, Owner and General Manager at NVP commented, "Our new OB van ranks amongst the most technologically advanced production units in Europe and is recognized primarly for its technical and operational efficiency. We use it for the most challenging productions all over Europe. SAM's technology is a critical piece of the puzzle when it comes to meeting the evolving requirements in the market place. The new truck means we are capable of producing SD, HD, UHD, SDR and HDR video, as well as leveraging the latest technologies such as IP."

Inside View

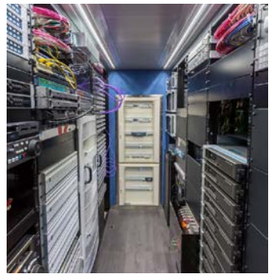


Production Area 1

Production Area 2

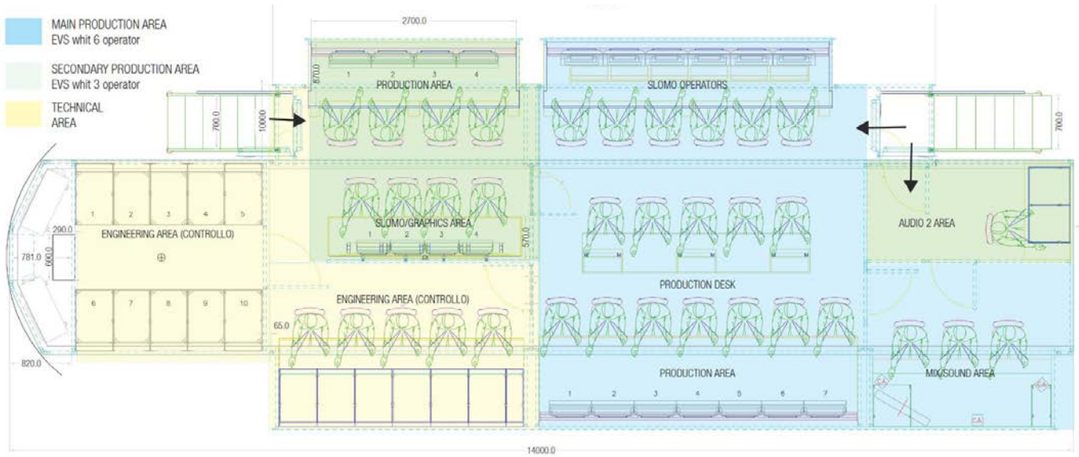
Sound Area

Replay SloMo Area



Equipment Racks

Vision Mixer



NVP.it Broadcast & Obvan

Equipment Specifications NVP OB4K
Triple Expando: 14m Long, 4m High, 2,5m Wide – Expands to 4,5m
Shifts between 4K/UHD+HDR + SDR | Super SloMo | 1080p | 1080i | 720p
SMPTE 2110 and SMPTE 2022 Standards Supported

LIVE PORTRAIT

NVP OB4K

OB Truck

Video

- 28x Grass Valley LDX 86N (4K and HDR)
- Lenses from Fujinon and Canon
- Tripods from Vinten
- 2x SAM Vision Mixer: Kahuna 6ME IP-3G
- 8x 43" UHD TVLogic Monitors in Production 1
- 6x 43" UHD TVLogic Monitors in Production 2
- Reference Monitor Canon DP 2410
- Multiviewer Grass Valley Kaleido MX 3G 4K
- EVS XT3 Production Servers
- 10Gb, 3Gbs SDTI, and GigE Network
- EVS XFile with USB 3.0
- System Control: Lawo VSM
- Digital Glue: SAM
- SAM Sirius Router 576 x 576
- Measurment Equipment: Tektronix WFM 8200
- Tektronix Dual SPG 8000

Audio

- Audio Mixer: Lawo mc²56 MKII
- Primary surface 48 + 16 Faders
- Secondary surface 16 + 16 Faders
- Audio Matrix: Lawo Nova73
- Audio Effects: SPX2000
- Audio Monitoring: Genelec
- Audio Analyser: Wholer AMP1
- Dante and Ravenna IP Support
- Microphones from Sennheiser

Intercom/Communication

- Matrix: Clear-Com Eclipse HX 256 x 256
- Commentary Positions: Glensound Infereno

System Integration

Video Progetti
A feeling for technology.

POINT 2 POINT

LIVE PORTRAIT

HD OBVan

OB Truck

General Contact

Point 2 Point - Videomit

Shadal 1, St
Tel Aviv
Israel

Kuriel Erez
Owner

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evideomit@gmail.com
http://en.point2point.co.il/

Point2Point's OB van is five meters long and has been designed to house up to eight crew members comfortably, including a live director, CCU, audio, graphics and director roles.

As a company, Point2Point's range of event production is extremely varied; from medical conferences and conventions through to live demonstrations at exhibitions and trade shows, and recently expanded to cover major international events including the Tel Aviv Marathon and President Trump's visit to Israel, where the OB van was stationed at the international press center. When the team planned out the truck, Erez Kuriel, Point2Point's owner envisioned it as one large working space, rather than divided into sections. This gives us a very flexible and spacious environment which can be adapted to our very varied calendar of OB jobs.

Production Area

Vision Mixer

President Trump Leaving Israel

TECHNICAL SYNOPSIS

HD OBVan

OB Truck

Point2Point

Equipment Specifications Point 2 Point HD OBVan
Box Style: 5m Long, 2,5m High, 2,3m Wide

Video

Cameras: 5x Blackmagic Design URSA Mini 4.6K
Lenses from Fujinon
Tripods from Manfrotto
Blackmagic Design Vision Switcher ATEM 2 M/E
Monitors: 2x Blackmagic Design SmartView 4K, 2x Sony 50"
Blackmagic Design Multiview 16
Record/Replay with Blackmagic Design HyperDeck
DigitalGlue Products from Blackmagic Design
Video Matrix from Blackmagic Design Videohub 20 x 20
Measurment Equipment: Blackmagic Design Smart Duo and Smart View 4K

Audio

Audio Mixer: Behringer X32
Audio Matrix: Blackmagic Design Smart Videohub 20 x 20
Microphones from MiPro

Intercom/Communication

Matrix: Chroma

For the Tel Aviv Marathon Point2Point set up the van next to the start/finish line, and to capture the atmosphere and scale of the race, the team set up four of our Blackmagic URSA 4.6K cameras, equipped with 7" viewfinders, intercom system and tally over Rockah Avenue, which were connected to the van via fiber optic. Simultaneously, to track the leading racers, there was one cameraman shooting from the back of a motorbike, and two drones also transmitting signals into the van.
The live program mix was delivered through an ATEM 2 M/E Production Studio 4K paired with a 1 M/E Panel, with the team adding live graphics, runner and race information into the mix. Interestingly, the ATEM's multiviewer was not only used by the production team, but also by the race's safety and security team, so 2 50" LCD screens were set up in the van. Signal distribution for the whole workflow is handled by the van's Smart Videohub 20x20.
As well as transmitting to the screens throughout the course, Point2Point also provided a live signal feed for national broadcasters who were covering the event on their morning shows. Content was also captured using our HyperDeck Studio Mini recorders, so that footage could be edited for clips and highlights for the Marathon's official site. The recorders are so compact, just a third of a rack, so they are perfect for an OB set up, where space is at a premium.

The team did an amazing job and produced some fantastic footage which really captured the excitement and enjoyment that the race generated throughout the city, and the Blackmagic production kit performed perfectly.

RADIO TELEVISYEN MALAYSIA

LIVE PORTRAIT

HD 1 OBVan

OB Truck

General Contact

Radio Televisyen Malaysia
Angkasapuri
50614 Kuala Lumpur

Tel: +60 3 2282 5333

aduan@rtm.gov.my
www.rtm.gov.my/

Radio Televisyen Malaysia (RTM) has 36 radio and three television stations in Malaysia. RTM is based in Kuala Lumpur and is the first broadcaster in Malaysia.

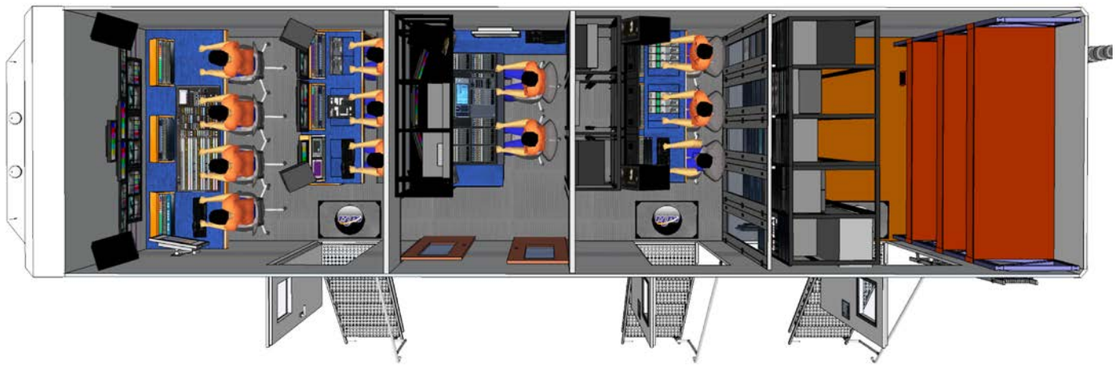
RTM celebrated its 70th anniversary on 1 April 2016. RTM started its television services in December 1969 and began broadcasting in colour in 1978. 24h broadcasting was introduced in 2006 and in 2010 RTM has started to switch its facilities to HD with the refurbishment of their studios. In 2015 RTM started full-time HD broadcasting

Production Area

Vision Mixer

Sound Area

Camera Shading Area



LIVE
PORTRAIT

HD 1 OBVan

OB Truck

Equipment Specifications HD 1 OBVan
Trailer: 10m Long, 4m High, 2,5m Wide

Video

- 6x Ikegami HDK-97A
- Wireless Camera Adapter from Vislink
- Connectors: Lemo SMPTE 311 Fiber
- Lenses from Fujinon
- Tripods from Sachtler
- Vision Mixer: FOR.A HVS-2000
- Character Generator: DataVideo CG350
- Monitors in Production Area: 3x BON 17" and 5x Craltech 24"
- Monitors in Camera Shading Area: 1x BON 17" and 2x Craltech 24"
- Monitors for SloMo: 3x BON 17" and 3x Craltech 24"
- Multiviewer/Splitter: Craltech Integrated
- Recording Devices Sony PMW-1000
- SloMo Device: NewTek 3Play 440HD
- Digital Glue from Axon and Imagine
- Video Controller: Lawo VSM
- Video Matrix: Nevion 64 x 64
- KVM Devices: Guntermann & Drunck
- Measurement: Leader LV5770, LV7770

Audio

- Audio Mixer: Yamaha M7CL-48ES
- Audio Matrix: Nevion 64 x 64
- RTW TMR7 Audio Scope
- Audio Monitoring: KRK
- Audio Multi-track: Panasonic
- Audio Effects: Lexicon MX200 and Yamaha SPX 2000
- Microphones from Shure

Intercom/Communication

- Matrix: Clear-Com Eclipse HX-Pico 36 x 36
- Talk-Back Clear-Com VSII, RiFace
- Telos HX2 Telephone Interfaces

Coach Builder and System Integrator

broadcast SOLUTIONS
www.broadcast-solutions.de

SBS KOREA

LIVE PORTRAIT

UHD1

OB Truck

General Contact

SBS Broadcasting Center

920 Mok-dong
Yangcheon-gu, Seoul
158-051 Korea

Joon Ho Yoon
Deputy Chief Engineer

Tel: +82 2 2061 0006

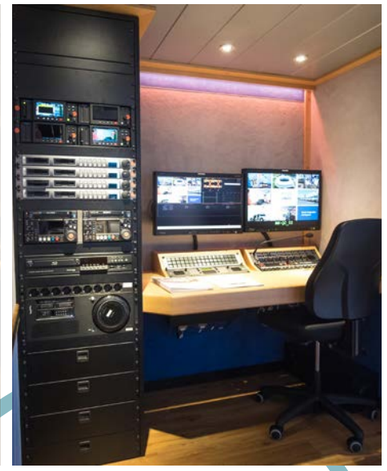
yoonjh@sbs.co.kr
www.sbs.co.kr

SBS is a national South Korean television and radio network. It is the only private commercial broadcaster with wide regional network affiliates to operate in the country.

The company legally became known as SBS, changed its corporate name from Seoul Broadcasting System to SBS in March 2000. It has provided terrestrial digital TV services in the ATSC format since 2001, and T-DMB (Digital Multimedia Broadcasting) service since 2005. Its flagship terrestrial television station is Channel 6 for digital and cable. The new OB Van successfully passed its first test on the production for the ISU World Cup Short Track Speed Skating competition at Gangneung, South Korea and will contribute to the production of high-quality programs for 2018 PyeongChang Winter Olympic Games UHD relay broadcasts.

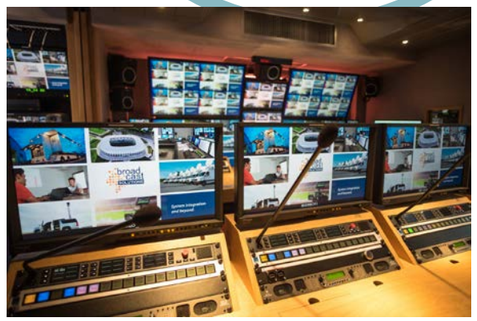
Production Area

VTR Area and QualityControl



Vision Mixer and Monitor Wall

Sound Area



SloMo Area

Camera Shading Area
& Equipment Racks

TECHNICAL SYNOPSIS

UHD1

OB Truck

Equipment Specifications SBS Korea UHD1
Single Expando: 11,35m Long, 4m High, 2,55m Wide Expands to 3,75m
Shifts between 4K/UHD+HDR | Super SloMo | 1080p | 1080i

Video

- 12x Ikegami UHK-430 on 12G-SDI UHD Single Link
- Connectors: Lemo SMPTE 311 Fiber
- Lenses from Canon
- Heavy Duty Tripods from Winton
- Vision Mixer: Ikegami 3 M/E Panel 4DSK/DVE 144in/48out
- Monitors in Production: 4x 42" TVLogic, 3x 24" TVLogic UHD
- Monitors in Camera Shading Area: 8x 24" TVLogic UHD, 1x 30" Sony
- Monitors for SloMo: 4x 21" TVLogic
- Multiviewer/Splitter: Evertz VIP-X
- 2x EVS XT3 12 Ch Full Editing Replay Servers
- 10Gb, 3Gbs SDTI, and GigE Network
- Digital Glue from Evertz, Lynx
- Video Controller: Lawo VSM
- Video Matrix: Evertz EMX 12G 128 x 128, Evertz EQX 3G/HD 288 x 288
- KVM Devices: Guntermann & Drunck
- Measurement: Phabrix QX, Leader LV 5381, Leader 5490

Audio

- Audio Mixer: Studer Vista X
- Audio Matrix: Studer Infinity Core 400 768 x 768
- MADI Router: DirectOut M.1K2
- Audio Glue: DirectOut and Lynx
- Measurement: RTW TM7, Leader LV5490, Wohler
- Audio Monitoring: Genelec / Focal 5.1 Surround Sound
- Audio Effects: TCM 6000
- Microphones from Sennheiser, Shure

Intercom/Communication

- Matrix: Riedel Artist 64 x 64
- Riedel/Motorola/Laon Radios
- AVT TH2plus Telephone Interfaces

System Integrator

TELEVIZIA MARKIZA

LIVE PORTRAIT

HD 1

OB Truck

General Contact

Televízia Markíza

Bratislavská 1/a
843 56 Bratislava
Slovakia

Jaroslav Gazda
Head of OBVan
Gazda.Jaroslav@markiza.sk

Michal Hudec
OBVan technician
Hudec.michal@markiza.sk

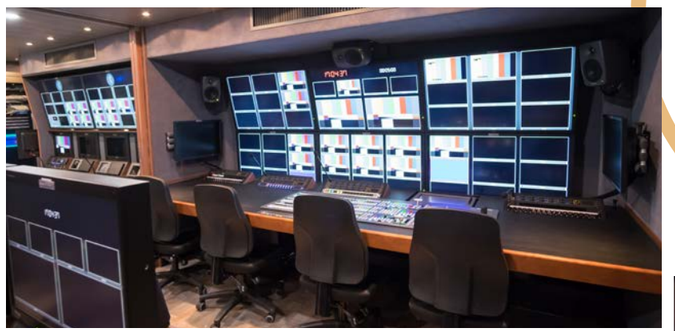
Tel: +421 910 840 920

In May 2017 Slovakian television network Televízia Markíza commissioned its new HD OB Van, which marks the completion of their transition to HD.

The OB Van is based on Broadcast Solutions GmbH's Alphaline A12 model and can work in productions with up to 16 cameras. Alphaline is a variant of the company's successful family of Streamline OB Vans of which more than 40 units are already built by the German system integrator working all over the world. With Alphaline, Broadcast Solutions offers the customers additional possibilities in terms of individual coachbuilding, workplace design and technical equipment. Teaming with Slovakian system integrator ELEKTRONIKA both companies provided a universal OB Van with the latest technical solutions enabling Televízia Markíza to handle a large variety of productions. A second important purpose the OB Van is dealing with is its use as disaster recovery solution for the studios of the company. An additional novelty in Alphaline OB Vans is the use of Riedel's MediorNet system as a decentralized signal routing and communications backbone, achieving the flexibility the customer demanded of its OB Van. The resulting OB Van offers the customer TV Markíza maximum flexibility and is a future-proof production tool to be used in the networks own large productions like "Let's Dance", as well as in chart-shows or sports events.

Inside View

Main Production

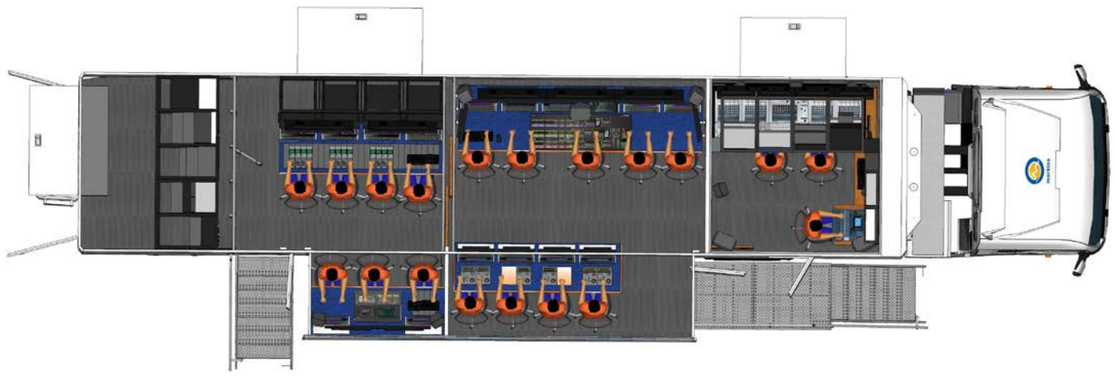


Sound Area

Replay / SloMo Area

Camera Shading Area

Equipment Racks



Equipment Specifications Markiza HD 1 OB Truck
Single Expando: 11,8m Long, 4m High, 2,55m Wide – Expands to 3,75m

TECHNICAL SYNOPSIS

HD 1

OB Truck

Video

- 10x Grass Valley LDX 80 Premiere, 1x LDX 86 SSM
- Connectors on Cameras, CCUs and Cables: Lemo SMPTE
- Lenses from Canon
- Wireless Camera Adapters from Vislink
- Heavy Duty Tripods from Sachtler
- Vision Mixer: Grass Valley Karrera K-Frame 3 M/E
- Character Generator: Vizrt
- 6x NEC 42" Monitors in Production 1
- 2x NEC 32" Monitors in Production 2
- 2x NEC 46" and 4x Sony 17" in Engineering/Camera Shading
- 4x TV Logic 24" Monitors for SloMo Control
- Multiviewer: Riedel MediorNet MicroN
- Recording Devices: Blackmagic HyperDeck, Stryme 8in/4out
- SloMo Replay Control: Grass Vally K2 Dyno
- Digital Glue: Imagine Communications and Riedel MediaorNet
- System Control: Lawo VSM
- Video Matrix: Riedel MediorNet: 16x MicroN, 1x MicroN Core 136x136
- KVM: G&D Neo 16
- Measurement Equipment: Tektronix WFM 5200, Phabrix RX 2000

Audio

- Audio Mixer: Lawo mc²56 XC and Yamaha QL1
- Audio Matrix: Lawo Nova73
- Audio Effects: ProTools
- Audio Multi-Track Recorders: Ableton
- Audio Monitoring: Genelec
- Audio Measurement: RTW TouchMonitor TM9
- Microphones from Sennheiser
- 2 Stageboxes with DirectOut Andiamo MC

Intercom/Communication

- Matrix: Riedel Artist 128 x 128
- Wireless Talkback Equipment from Riedel and Motorola
- ISDN Codec: Mayah

System Integrator

broadcast SOLUTIONS

ELEKTRONIKA

TIMELINE \TV

LIVE
PORTRAIT

UHD2

OB Truck

General Contact

Timeline Television Ltd.

Ealing Studios, Ealing Green
London
W5 5EP
United Kingdom

Martin Bailey
Head of Outside Broadcasting

Tel: +44 8450 944 445

martin.bailey@timeline.tv
www.timeline.tv

Timeline's state-of-the-art IP 4K HDR outside broadcast truck is one of the most advanced in the world.

With an Arista 100G switch at its heart and SAM IP infrastructure UHD2 delivers large scale complex OBs simultaneously in uncompressed 4K UHD HDR and 4K UHD SDR. IP technology removes traditional SDI matrix limits enabling production teams to fully harness the power of UHD 4K. UHD2 is based around the SMPTE 2110 standard enabling both audio and video to be processed in the IP stream.

IP Routing

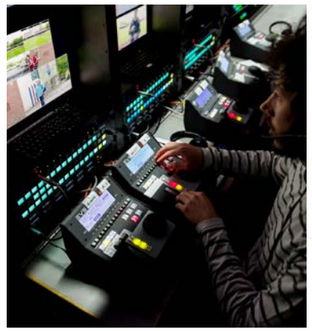
Production Area

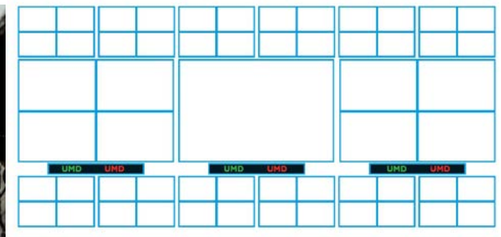
Sound Area

Broadcast Anywhere
Timeline TV

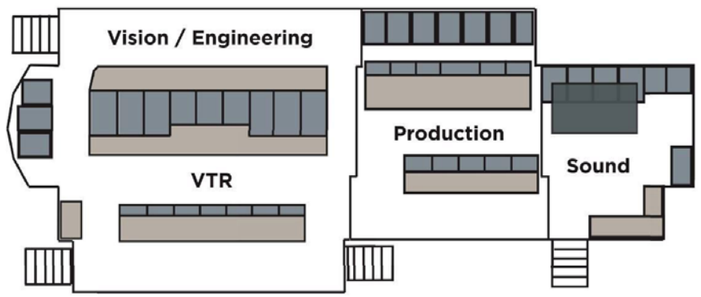
Camera Shading Area

Sound Guarantee





Replay Area



Broadcast Anywhere
Timeline\TV

Equipment Specifications Timeline\TV UHD2
Triple Expanding: 12m Long, 4,2m High, 2,5m Wide – Expands to 6m
Formats/Standards include 4K/UHD+HDR
+ SDR | Super SloMo | 1080p | 1080i | 720p
SMPTE 2110 and SMPTE 2022 Standards Supported

TECHNICAL SYNOPSIS

UHD2

OB Truck

Video

- 32x Sony HDC-4300 4K/UHD/SSM Bi-Motion Cameras
- UHD Radio Camera Links with a 2-Frame Delay
- Lenses from Fujinon, UA80, UA22, UA13
- Vision Heads & Tripods from Vinten
- 2x SAM Vision Mixer: Kahuna 6ME IP
- 3x 49" UHD Prouction Monitors
- 60x Preview Monitors
- Character Generator: 2x 4K GFX Machines
- Central VT Coordination Position with 46 Monitors
- 12x EVS XT4K Production Servers and 2x EVS Archive Servers
- 10Gb, 3Gbs SDTI, and GigE Network
- EVS XFile with USB 3.0
- Baseband Video Conversion - 25x SAM Mix Cards
- System Control: Axon Cerebrum
- Arista 7504R Switch, 144x 100G ports, Effective Matrix Size 4,608 x 4,608 – Switching Capacity of 14,5 Tbps
- SAM IP Multiviewers
- Measurment Equipment: Tektronix WVR8300
- Six outgoing TX Chains with Dolby 5.1 and Dolby Atmos

Audio

- Audio Mixer: Calrec Apollo (56 faders)
- Calrec Hydra2 – Bluefin 2
- Dolby 5.1 and Dolby Atmos encoding
- Audio Effects: SPX2000
- Audio Monitoring: Dynaudio
- Audio Multi-track: Spot On
- Microphones from Sennheiser

Intercom/Communication

- Matrix: Riedel Artist 128 x 128
- Tait Duplex Basesets
- Motorola DP1400 Radios

Power Required

- 2x 125A 3 Phase C-Form

TURKMENISTAN

LIVE PORTRAIT

HD OB Truck

OB Truck

General Contact

TV, Radio and Cinematography Committee of Turkmenistan

2100 Street 1, TV Tower
Ashgabat
Turkmenistan

Tel: +993 1244 2200

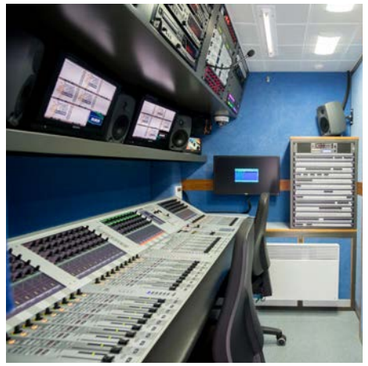
http://tdh.gov.tm/en/

In close cooperation with Turkish company Polimeks Broadcast Solutions GmbH has delivered a huge fleet to Turkmenistan TV, consisting of 16 vehicles in two phases of construction.

Polimeks is the general contractor for Ashgabat Olympic Complex in Turkmenistan and coordinate all broadcast facilities. Each set of production vehicles delivered consists of an OB Van, support tender, generator van and a SNG. The last set is conducted completely in UHD. All production resources will be used at the Asian Indoor and Martial Arts Games from 17 to 27 September 2017 at Ashgabat Olympic Complex, Turkmenistan. The OB Van portrayed is part of the second delivery, that took place in 2017.

Production Area

Sound Area 1



Equipment Rack

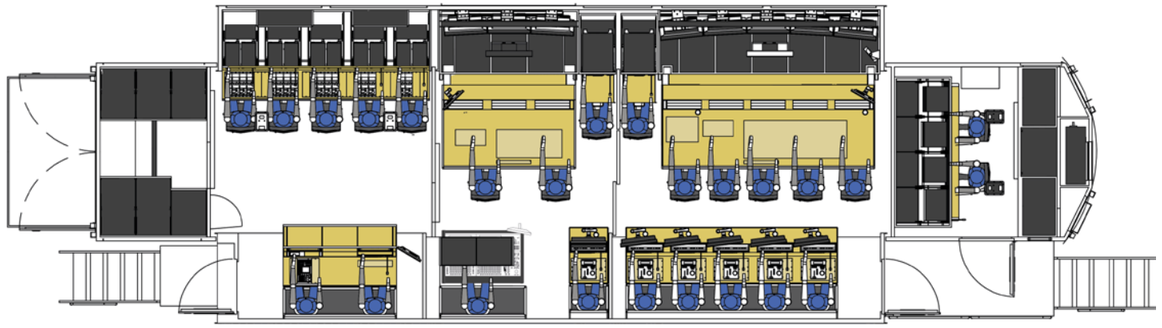
5th Asian Indoor & Martial Arts Games
TURKMENISTAN
Ashgabat 2017

SloMo Area

Inside View

Camera Shading

Sound Area 2



LIVE
PORTRAIT

HD OB Truck

OB Truck

Equipment Specifications Turkmenistan HD Truck
Double Expando: 14m Long, 4m High, 2,55m Wide
Expands to 4,45m

Video

- 8x Sony HDC-2500, 2x HDC-4300, 1x HDC-4800
- 2x Wireless Camera Adaptors from Vislink
- Connectors: Lemo SMPTE 311 Fiber
- Lenses from Canon
- Heavy Duty Tripods from Vinten
- Vision Mixer: Sony MVS-8000X with two Control Panels
- Character Generator: Orad
- Monitors in Production 1: 15x Sony 25”
- Monitors in Production 2: 9x Sony 25”
- Monitors in Camera Shading Area: 8x Sony 17”
- Multiviewer/Splitter: Evertz VIP-X
- Recording Devices: Sony PDW-F1600, 2x HDW-M200P, 2x XDS-PD1000, 2x Blackmagic HyperStudio Pro,
- 4x Evertz DreamCatcher Replay Servers
- 10Gb, 3Gbs SDTI, and GigE Network
- Monitors for SloMo: 6x Iliama 17”
- Digital Glue from Evertz
- Video Controller: Lawo VSM
- Video Matrix: Evertz EQX 10
- KVM Devices: Guntermann & Drunck
- Measurement: 4x Tektronix WFM-5200, 2x WVR-8200

Audio

- Audio Mixer: Studer Vista 5 and Studer Vista 1
- Audio Matrix: Studer
- Audio Converter: DirectOut Andiamo
- Measurement: RTW TM9 Audio Scope
- Audio Monitoring: Genelec, 5.1 Surround Sound
- Audio Multi-Track: Tascam
- Audio Effects: TC Electronics M6000
- Microphones from Sennheiser, Sony, Holophone

Intercom/Communication

- Matrix: Riedel Artist 128 x 128
- Riedel RiFace / Motorola Radios
- Riedel MediorNet Stageboxes
- Riedel Connect Telephone Interfaces

System Integrator

TV GLOBO

LIVE PORTRAIT

UM7

OB Truck

General Contact

Tecnologia Globo

Rua Lopes Quintas 303, Room 405
Jardim Botanico
Rio de Janeiro
RJ 22460-010
Brazil

Jose Manuel Fernandez Mariño
Director Sports Technology

Tel: +55 21 2540 3085

jose.marino@tvglobo.com.br
www.tvglobo.com.br

TV Globo's OBVan has a unique 4K system totally IP-based in 10Gb and 40Gb FO, using COTS IP Switches, where our 4K cameras and replay servers deliver their signals through NMI to our matrix and both ours 4K switcher.

The OBVan also features a fully featured SDI signal layer that we can use to produce in HD-SDI and also serves as disaster recovery for the IP layer. Another unique feature is our Super SloMo system composed of 3 Sony HDC-4800 cameras equipped with 35mm sensor and Canon CN20x50 lenses, which can produce a 8x 4K SloMo replay, and works integrated to Sony's Replay System - PWS-4500 - through SharePlay operation. This operation utilizes file sharing over a single network linking both equipments. By using this type of cameras and lenses we were able to develop a new type of photography for our scoccer games, allowing the cameramen and the TD to explore the shallow depth of focus as an extra tool to create greater visual impact and direct the viewer's attention to the image content they want to highlight for a particular shot. They can also play with the focus, shifting from one point to the other in a single shot.

Production Area

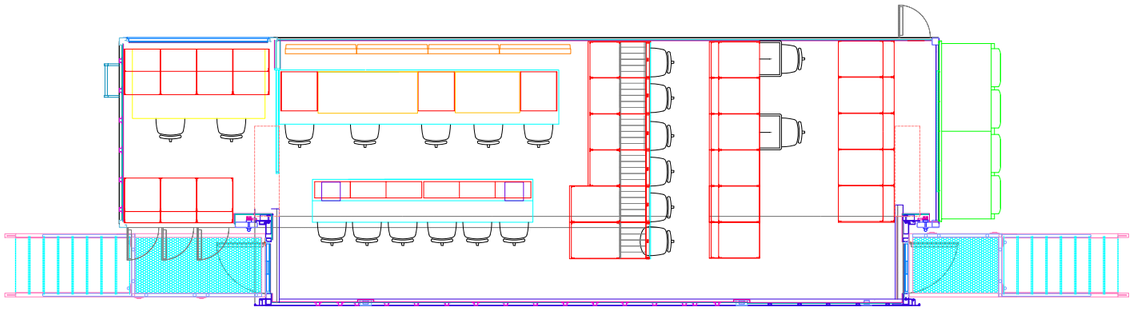
Vision Mixer

Sound Area

SloMo Area

Camera Shading Area

TV GLOBO | *OB Truck UM7*



TECHNICAL SYNOPSIS

UM7

OB Truck

Equipment Specifications TV Globo UM7
Single Expando: 12m Long, 4m High, 2,59m Wide Expands to 3,65m
Shifts between 4K/UHD+HDR | Super SloMo | 1080p | 1080i | 720p

Video

UHD Cameras: 6x Sony HDC-4300, 3x Sony HDC-4800, 1x i-movix X10, 1x Sony F65RS
HD Cameras: Sony HDC-3300, 4x TV Skyline HD1200
Wireless Cameras: 2x Sony PDW-F700 with Vislink L1700
Connectors: Nemal SMPTE Fiber
Lenses from Canon and Fujinon
Heavy Duty Tripods from Sachtler
Vision Mixer: 2x Sony XVS-8000
Character Generator: ChyronHego Mosaic XL 4K
Monitors in Production 2x Sony BVM-X300, 10x Sony PVM-A250, 4x Planar SL4250, 6x Marshall V-R173
Monitors in Camera Shading Area: 1x Sony BVM-X300, 2x Sony BVM-E170, 4x Sony PVM-A170, 8x Marshall V-R173
Multiviewer/Splitter Imagine PX-SXP-64x6
Recording Devices Sony PDW-F1600
and Blackmagic HyperDeck Studio Pro
4x EVS XT4K 12 Ch Full Editing Replay Servers and 2x Sony PWS-4500
10Gb, 3Gbs SDTI, and GigE Network
Digital Glue from Imagine FR6822 + QXFE
Video Controller: Imagine Magellan
Video Matrix: Imagine Platinum 288 x 512 and Cisco N9K-C9332PQ and N9K-C9372PX/TX
KVM Devices: IOGEAR GCL1816KIT
Measurement: Tektronix WFM5000, WFM5200, WFM8300, WFM7120

Audio

Audio Mixer: Studer Vista X 42 Faders and Yamaha DM1000
Audio Matrix: Imagine PT-AECT/DACT/MADI
Measurement: RTW TM9 and 31960SD
Audio Monitoring: Genelec, 5.1 Surround Sound, TSL PAM-1/2
Audio Effects: Imagine APM6803+RLYT (Dolby)
Microphones from Sennheiser and Countryman

Intercom/Communication

Matrix: Clear-Com Eclipse Omega, MX-840 20 Ports, MX-840 40 Ports
Talkback Equipment: Motorola and Sennheiser
ISDN Codecs: Clear-Com and Comrex

System Integrator

STREAMLINE YOUR PRODUCTION WORKFLOW

Draco tera enterprise and compact switches, 8 to 576 ports

KVM Solutions for Live Production

KVM switches connect operators to broadcast devices from their own workstations, without moving or changing position in the cramped confines of mobile production studios.

Broadcast professionals can access any device, whenever they need to, simply and quickly, with no transmission delay or image degradation.

- Instant connection and switching
- Latency and artefact-free video and audio
- HD-SDI and SDI parallel switching
- Integration with broadcast controllers
- Modular, expandable, future-proof
- Secure and reliable

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CTV A PERFECT MATCH FOR REALITY TV HIT

FIRST DATES HOTEL

With Cerebrum at the heart of its operational set-up, CTV delivered an 'impressive, glossy and flexible' front-end and the ability to manage productions seamlessly.

When CTV was tasked by TwentyTwenty to deliver the hotly anticipated reality TV show First Dates Hotel for Channel 4, the OB company turned without hesitation to Axon's Cerebrum control and monitoring platform to ensure the production ran smoothly. Shot on location in the South of France and screened early in 2017, the UK reality TV production demanded seamless control of a complex Powered by Ethernet (POE) workflow, including 80 remote cameras - with Cerebrum at its heart.

CTV already relies on Cerebrum for major OB sports productions, such as The Open, where it enables crews to simply control and manage a huge number of external sources. Given the complex set-up for First Dates Hotel, which employed IP infrastructure to capture and manage the action remotely, the team had complete confidence that Cerebrum would provide agile and robust control as well as support a hassle-free, flexible creative workflow.

A fully resilient Cerebrum system was employed, managing IP camera control units, tally, UMD contribution and linking together the main broadcast equipment including the video router and two Lawo V-pro8 video processors. 80 Panasonic fixed-rigged IP cameras throughout the hotel, with 18 robotic units located poolside, were controlled via twenty CCP-4200 42-button colored LCD 1RU panels. These high-density panels, a bespoke Axon design for CTV, dramatically simplified the workflow enabling all devices to be controlled from a user-friendly interface with flexible color-coding to easily navigate between the five main camera zones.

The dynamic features of Cerebrum – completing tasks in minutes that previously took hours to achieve - make it a perfect match for reality TV productions and its power was experienced first-hand by the team on location in Provence. With a dedicated remote operator sat beside each of the three directors in the gallery, recording four cut streams (12 in total), directions could be given in real-time and the results made available immediately.

"Cerebrum's speed and feature-set offered great creative opportunities for the directors on this production," comments Richard Morton, Base Technical Supervisor at CTV OB. "They didn't have the time or the inclination to take on the technicalities of the set-up but with Cerebrum, the director could talk through ideas with the operator beside him, who then recorded, configured and executed his directions in front of his eyes. That blew them away! They were really impressed by the freedom Cerebrum gave them and the whole vibe of the production was upbeat and positive as a result."

For CTV's engineering team working in a new Powered Over Ethernet environment was also a positive experience. In a traditional hardware set-up, having to use the rig as a distributed system was a lengthy and costly exercise with miles of unsightly cable runs to manage. In this IP environment, the team reduced cabling on site and eliminated cumbersome kit in the rig, reducing a whole bay into a single server. Cerebrum provided robust, complete control and back-end IP integration with camera switching into the server itself - dramatically simplifying the workflow with control of local network camera switches.

"We have had extensive experience working with Cerebrum in live sports and have complete confidence in the system in that environment," says Morton. "In reality TV, directors face different creative challenges and need greater flexibility. Our close collaboration with Axon lets us proactively address those needs and gives us real competitive advantage. With Cerebrum at the heart of our operational set-up, CTV can provide our clients with an impressive, glossy and flexible front-end and the ability to manage productions seamlessly. It just works!"

Away from Provence and the four-star Le Vieux Castillon hotel, CTV has meanwhile worked with Axon on two further deployments of Cerebrum for 2017: a studio facility and the refurbishment of OB11, the largest 20-camera 4K-capable OB truck in Europe which is undergoing a complete video technology refit, also featuring Axon 3G & 4K glue equipment.

AXON THE HEART OF BROADCAST | CTV OUTSIDE BROADCASTS An EMG Company | CEREBRUM Broadcast control and monitoring

The Arcadia Spectacular

A 50-tonne mechanical spider spewing fire, electricity and laser beams might sound like an arachnophobe's worst nightmare, but the Arcadia Spider is leaving audiences around the world breathless as part of a spectacular immersive multi-media show.

The concept began ten years ago when Arcadia founders Pip Rush and Bert Cole decided to reshape linear stage environments into an immersive, 360 degree experience. Their idea was to engulf audiences from every conceivable angle with creative elements that harnessed the senses. And so, in a cowshed in Dorset, they began building the show that was to become Arcadia, and which launched to huge acclaim at Glastonbury in 2007.

The spider stands at the heart of a 360 degree immersive arena, built from repurposed military and industrial hardware. It is a fully integrated structure with special effects, including 50ft fireballs, lasers, pyrotechnics and huge jets of CO_2, with mechanical moving arms that are rigged for aerial performance as well as a DJ booth suspended above the crowd. Brought to life through creative engineering and cutting edge technology, the spider is sustainable, built to last and an unforgettable experience.

Arcadia has developed a trilogy of shows: The Landing, where the spider makes 'first contact' with the audience with interactive aerial performances, abductions and breath-taking pyrotechnics; Metamorphosis, which extends the action across the arena with seven metre long mini spiders crawling overhead, pyrotechnic-driven performer spins and lightning shows in the midst of the crowd; and The Finale, which sees the spider unleash its full power to a spectacular soundscape. With so many high-risk elements in a live show, it's imperative for the production team to be able to communicate across the wide and extremely loud set, to ensure everything proceeds smoothly and safely.

Tim Smith is the Technical Production Manager for Arcadia Spectacular, who describes his role as "taking the creative ideas and transferring them into real life across all the special effects, lighting and technical equipment, ranging from visual through to audio and communications."

"Comms is vital to us in the show; with so many special effects and aerial performance, safety is paramount," he says. "Without clear, concise communication we wouldn't be able to operate in a safe way." Tim chose a FreeSpeak II wireless intercom system linked to a HelixNet digital network partyline intercom system, with around 20 FreeSpeak II belt packs and 25 HelixNet belt packs, converging into one overall system to connect the entire production team.

"From my time in the industry, Clear-Com has been rock-solid through corporate, rock and roll and theatre, so it was the only choice to go with," says Tim. "There was no-one else really to compare."

The system is used with two different modes: the 'performance show mode' is primarily led by the show caller, and this is received by everyone on Channel A. The second mode allows each department to have its own separate and private group on the system.

"A good example is the flame team," says Tim. "They have their own dedicated channel to discuss issues like pressure, refuelling and safety aspects.

The show is time-coded, so when we're heading towards the point in the show when we'll be using flames, they have a five-minute safety procedure to go through before we start. Everyone in the team is somewhere different on the set so they have to co-ordinate via comms. Without individual groups we wouldn't be able to perform these kinds of checks, as there would be too many people talking over the top."

Other individual groups on the system include one for the management team to deal with on-site emergencies, a patrolling security team to look for problems with the installations, plus the riggers and performance teams have their own groups.

The roaming nature of the FreeSpeak II system is also a key benefit for the Arcadia team. "We have around 5000sq/m to cover, and being a 360 stage we don't have a front and back," Tim explains. "Therefore we have to cover an entire arena for wireless usage, from ground level up to a height of around 25m, and with a line of sight is around 120m on average. We've managed to do all this with 10 antennas."

Tim stresses that safety is the biggest concern and challenge for the show. "The Clear-Com system assists by enabling us to communicate from our front of house through to our production offices all the way up to the spider, allowing us to ensure that everyone is doing what they need to do, and they're where they need to be," he says. "With the special effects, it's vital that we know we're in safe zones, that clearance is happy, that we're monitoring wind levels...all of these aspects must be communicated to the various heads of departments. The Clear-Com kit enables us to do that with great ease."

The FreeSpeak II system also offers excellent audio clarity despite the incredible noise levels in the arena. "There are six PA towers facing into the middle with a 30K+ sound system, plus special effects, not to mention the noise generated by an excited audience," says Tim. "The Clear-Com system is clear and concise allowing for operators, riggers, engineers to talk rather than shout down the system to each other, allowing for clear communication even in the loudest environment."

During the Metamorphosis show there are three Tesla coils in the arena, outputting four million volts of electricity and creating a large electro-magnetic field. "FreeSpeak II seems to be the only wireless communication system that will work next to a Tesla," Tim says – something that Clear-Com might consider adding to its product spec....

From the UK to the US, Croatia, Australia, Taiwan and Thailand, the spider is wowing audiences – and the production team is staying safe, with help from Clear-Com.

PILGRIM MEDIA GROUP USES THE EnGo TO CATCH "THE RUNNER"

About Pilgrim Media Group

Pilgrim Media Group, a Lionsgate company (NYSE: LGF.A, LGF.B), produces a wide variety of unscripted and scripted programming for television and film, including hit series Fast N' Loud, Street Outlaws, Misfit Garage and The Wheel for Discovery; My Big Fat Fabulous Life for TLC; Ghost Brothers for Destination America; Wicked Tuna and Wicked Tuna: Outer Banks for National Geographic; two-time NAACP Award-winner Welcome to Sweetie Pie's for OWN; Bring It! for Lifetime; David Tutera's CELEBrations for WE tv; and Zombie House Flipping for FYI. In the scripted realm, Pilgrim produced Freeform series Recovery Road and original movies for Lifetime including Amanda Knox: Murder On Trial In Italy; Abducted: The Carlina White Story, which earned a 2012 NAACP Image Award for Outstanding Writing In A Motion Picture; and the crime thriller Stalkers. Pilgrim recently wrapped an urban agriculture-based feature documentary that is currently screening at various festivals, and announced a new feature film documentary, "Soufra" (Arabic for "feast"), which chronicles the powerful -- and delicious -- story of Mariam Shaar who, along with a diverse group of equally driven women, transcended the limitations of life in an impoverished refugee camp to launch a successful catering company.

The Challenge

It was more than 17 years ago that Matt Damon and Ben Affleck came up with the idea of "The Runner," but it took until 2016 for technology to become available that would make the multi-platform idea work for a mainstream, global entertainment audience. The idea: A "Runner" has 30 days to make it across America while the entire country attempts to solve clues that help their favorite "Chase Teams" – who are constantly in pursuit – go after more than one million dollars in prize money. If the Runner is caught, then a new Runner takes over from that point.

Because The Runner's game play and audience engagement depended on coverage of the action in real time, no one could know in advance where the action or the story would go. The key challenge was to figure out how to quickly move high-quality content back to the studio for editing, and provide live feeds from constantly changing locations. Producer Pilgrim Media Group worked closely with the project's Technical Consultant, Jerry Kamen, to develop the infrastructure and workflow necessary for a project like "The Runner." It was then that Pilgrim Media Group approached Dejero about using our technology for the groundbreaking reality competition series.

So, how did Dejero make it happen?

The Solution

The production team used nine Dejero EnGo mobile transmitters to encode and transmit all live and recorded video back to Pilgrim Media Group's Los Angeles studios for daily editing. Small enough to be wearable or mounted on the camera, the EnGo's form factor and the fact that it was battery powered made it ideal for this highly mobile shoot.

When a traditional camera would risk drawing attention to the Runner—making it too easy for the Chasers—producers used the Dejero Mobile App whenever discreet shooting was required to create and share video content from their phones. Since it was impossible to predict the moment when a Runner would be captured, using the app often proved easier and more efficient than setting up a camera. This meant content delivered by the Dejero Mobile App was frequently featured in The Runner's unscheduled "Breaking News" segments.

Dejero's patented network blending technology created a virtual network that dynamically and intelligently managed the routing of packets to minimize the effects of fluctuating bandwidth, packet loss, and latency differences of individual cellular connections. The blended network provided the necessary bandwidth to quickly transfer Pilgrim's content back to the studio for editing.

8 Field Crews

1. On location, the crews running with cast were comprised of a producer/shooter and audio mixer. They used a combination of Dejero EnGo mobile transmitters and Mobile Apps on their phones to capture footage of the runner and the chase teams.

2. All footage in the field was passed off to the media management team that processed all footage via the EnGo to the Dejero Broadcast server in Los Angeles, over multiple cellular connections. The team also levered the bonded transmission through the EnGo for multiple live hits each day and breaking news segments.
3. Back at the studios in LA, editors set up watch folders to get alerts for when a new file was added. From there, the editors either edited the content or sent it directly to air.

Results

The ability to get our footage to the studio rapidly was vital in order to meet our deadlines for the three daily live shows. Dejero's blended network technology was the only realistic tool for producing The Runner, as the teams began in one city and ended in another every single day. I was delighted with Dejero's technology, which performed extremely well, and the support was outstanding.
Jerry Kaman of Broadcast Engineering Consultants

"The Runner" is an excellent example of how Dejero's technology can be used for so much more than the live transmission of video. On average, the Pilgrim production teams were able to transmit nearly 100 GB of content per day plus another two hours of live video. The result? 75 episodes over 30 days – that's no small feat!

Products used in The Runner workflow

- *Dejero EnGo*
- *Dejero Broadcast Server*
- *Dejero Control*

Dejero PILGRIM MEDIA GROUP

Imagine Communications Platinum Router Takes Starring role in Revitalization of BBC Studioworks' Television Centre

Customer Profile

BBC Studioworks Ltd is a commercial subsidiary of the BBC providing world class studios and post production services to all the major broadcasters and independent production companies – from the BBC's EastEnders, Children in Need and Strictly Come Dancing to E4's Virtually Famous, ITV's The Chase, ITV2'S Celebrity Juice and Sky's A League of Their Own.

The core of BBC Studioworks' operations are located across Elstree and Television Centre in White City, London.

Business Challenge

Following a comprehensive renovation project, Studioworks is preparing to re-open three studios as well as post production facilities at the iconic Television Centre, located in London's White City. For over 50 years, Television Centre was the home to scores of popular British television shows before being sold to property developer, Stanhope plc, in 2012. The redevelopment project has seen a wide-ranging overhaul of the facility, with Studioworks upgrading everything from dressing rooms and the scenic power and hoists, right through to new ventilation and building management systems. Studioworks has also been refreshing the facility's technology infrastructure.

While a greenfield technology site eliminates the burden of backward compatibility, it also lengthens and expands the evaluation process due to the need to test and stress a wide-open field of technology options. Given the industry's ongoing transition from HD to UHD, as well as the increasing prominence of IP for transporting video and audio signals, Studioworks' technical team were challenged to purchase technology for the three new studios that is optimized to meet today's demands but also capable of satisfying the video consumption appetites of at least another generation of UK television viewers. Future support for IP-based production, UHD and HDR was imperative.

Television Centre's storied broadcast history also meant that Studioworks' refurbished facilities would require meeting exacting quality and reliability standards. A robust and centralized routing architecture, specifically designed for complex and high-demand management of all video and audio signals was a key requirement. With the wider Television Centre site now a mixed-use building that includes housing units and shops, Studioworks needed to make the most of available square footage by selecting powerful but compact equipment capable of integrating multiple functions and capabilities into a space-saving footprint. The high-volume nature of the studios at the new Television Centre also necessitated new levels of versatility, as each studio would be required to accommodate quick reconfigurations to accommodate a variety of program types, all with different technical nuances and requirements.

Technology Solution

Following an 18-month evaluation period, in which Studioworks technologists 'kicked the tyres' of a number of solutions, the company selected Imagine Communications to supply the facility's core signal routing and management infrastructure. The design of the new Studioworks facility will utilise two Platinum™ IP3 28RU router frames. One will be dedicated to Studio TC1, which will be equipped to provide both HD and UHD production capabilities. The second IP3 will handle signaling for the other two studios, TC2 and TC3, at the refurbished facility. Both routers support a mixture of copper and fibre connectivity and have interface modules to link to the facility-wide MADI audio infrastructure.

John Dunkley
Television Centre Project Manager at BBC Studioworks

The IP3's built-in versatility was one major consideration in Studioworks' selection. In addition to its core signal distribution functionality, the Platinum IP3 supports audio multiplexing and de-multiplexing, flexible and integrated multiviewing, and discrete AES or MADI signals.

"From our technology reviews, we felt that the Platinum IP3 gave us important benefits in system design," said John Dunkley, Television Centre Project Manager at BBC Studioworks. "***The hybrid routing functionality eliminates the need for a separate audio matrix, and the I/O processing capabilities simplify the system architecture and increases flexibility. And the router's integrated multiviewer also simplifies overall system architecture."***

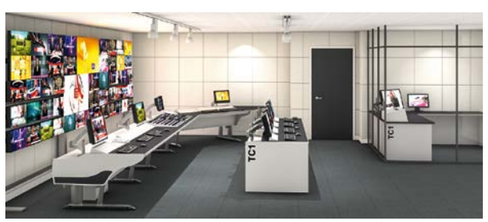
The functionality of the Platinum IP3 is designed to be forward-looking and futureproofed. It is anticipated that the router's support for hybrid SDI-IP workflows will provide the company with a smooth and seamless transition path from HD to UHD, HDR and, eventually, higher resolution formats – as well as putting Studioworks on the path to all-IP operations. The IP3 is controlled by Imagine Communication's Magellan SDN Orchestrator, a software-based control system that supports transparent operations across the two signal formats by providing seamless and synchronous switching between SDI and IP domains. Magellan SDNO is also capable of supporting third-party solutions, providing a single control system for multivendor environments.

Looking forward, the IP3 also presents Studioworks with a variety of options for supporting IP-based workflows. The Platinum IP3 can be fortified with IP input and output modules based on the AIMS (Alliance for IP Media Solutions) roadmap to seamlessly connect to IP networks built using commercial off-the-shelf (COTS) ethernet switches. In terms of accommodating Studioworks' eclectic production requirements, the IP3 is able to save and instantly retrieve a variety of production configurations. The router's quick-change capabilities help the production house reduce the amount of time it takes to prepare each studio for new production requirements.

Business Value

Seizing the opportunity to fortify its refurbished legendary TV studios with a greenfield, state-of-the-art technology foundation, Studioworks set out on an 18-month mission to assemble the optimal infrastructure for both today's and tomorrow's television production requirements. The routing and management of signals across three separate studios was of tantamount importance to Studioworks, which required a solution that would reduce complexity and conserve precious facility space by integration multiple capabilities into a compact footprint. The Imagine Communications Platinum IP3 was selected due to its expected reliability, ability to handle both video and audio routing requirements and the integration of a multiviewer and other capabilities that often eat up additional rack space as standalone systems.

It is also anticipated that the router's suitability for both SDI and SDI-IP hybrid environments will provide Studioworks with a seamless and affordable path to the adoption of next-generation technologies, ensuring that the company is able to meet the video consumption requirements of production companies and broadcasters for the foreseeable future.



Similarly, simultaneous support for HD and UHD, and the ability to quickly toggle between the two, positions users of this technology to provide a transition path to higher resolution services.

Through its collaboration with suppliers such as Imagine Communications and Dega Broadcast Systems, the UK-based systems integrator overseeing the technology restoration of Television Centre, Studioworks will be equipped with one of the most up-to-date, futureproofed and flexible studio spaces in the UK.

Customer:	BBC Studioworks
Industry:	European broadcaster
Business Challenge:	
	Equip legendary and recently restored production studios with a new state-of-the-art technology foundation that will seamlessly evolve to meet future video consumption requirements
Products:	
	Platinum™ IP3 28RU Router
	SX Pro™ multiviewer
	Magellan™ SDN Orchestrator control system
Business Value	
	Scalable routing architecture that enables easy migration to next-gen technologies
	Robust and centralized routing architecture specifically designed for complex and high-demand management of all video and audio signals
	Dense multi-functionality reduces operational complexity and conserves precious studio space
	Centralize control system that supports both SDI and IP signal management provides seamless upgrade path to next-generation technology adoption

Imagine COMMUNICATIONS

BBC STUDIOWORKS

DEGA BROADCAST SYSTEMS

Mediacorp - Singapore's pre-eminent multi-platform broadcaster bases operations around IHSE's Draco tera KVM switches and extenders

Mediacorp pioneered the development of Singapore's broadcasting industry, beginning with radio broadcast in 1936 followed by television broadcast in 1963. As over-the-top media distribution evolved, the organisation embraced new technology and transmission methodology. Today, it is the leading Singapore-based media company covering the widest range of media platforms; spanning digital, television, radio, print and out-of-home media with over 50 products and brands in four languages (English, Mandarin, Malay and Tamil). The organisation's recent move to Singapore's ultra-modern media hub at Mediapolis@One-North instigated a new era of broadcasting, radio and online operations for Mediacorp.

To meet its consumers' changing viewing behaviour, Mediacorp has discarded old operational habits and departmentalised working to establish and foster closer interaction between production and distribution operations, enabling it to accelerate and simplify operational workflows. With a wide and versatile range of technology from almost 40 manufacturers the facility embraces a service-orientated architecture with automated end-to-end file-based workflows and a deeply integrated enterprise orchestration layer. Functioning together, the result is seamless interaction between the different business units via a common platform. Enhanced collaboration between departments allows more than 1,500 people, including journalists for TV, radio, news and online media and technical operation teams, to work together and share resources across the whole campus from ingest to playout.

Rapid project completion

The whole project was completed in less than four years from initial concept to final commissioning, enabling Mediacorp to launch services from the new facility on the target date in late 2016. During the process, a wide range of best-of-breed technology was identified and the complete system design and integration completed within that period; as well as full system commissioning and user training.

The new 79,500 m2 campus includes six networked TV and news studios, a 1,500-seat broadcast-ready theatre, 14 radio studios and over 100 individual editing and post-production stations. Operations span all the necessary business fields including extensive online distribution and OTT services as well as press and publishing departments.

A fully integrated multi-lingual newsroom was constructed and integrated on a single 3,000 m2 floor with three news studios featuring cutting-edge LED video walls, AR/VR technology and four flashcam positions.
The new Mediacorp Campus is one of the most modern multi-media broadcast and media centres in the entire South-East Asian region today. Mediacorp currently delivers to the widest range of media platforms in Singapore spanning digital, television, radio, print and out-of-home media.

Live studio and media operations

In order to address the needs of a wide range of production and support staff, Mediacorp required a way of connecting and managing an extensive portfolio of live news and media operation production equipment to operational staff spread widely throughout the facility. Three separate systems were required in the news, studio and media operations areas to ensure instant and flexible access to the appropriate equipment, whenever and wherever operators need it.
Qvest Media, the local system integrator, was awarded the responsible for the entire operational planning and integration of the project. They, in turn, teamed up with IHSE APAC's local system integration partner, Broadcast Engineering Services, to design and deliver an efficient and robust KVM switching system for the media campus that would meet the connectivity requirements for the three areas. In the news area, a fully redundant KVM system comprising two Draco tera 160 port enterprise switches and redundant variant CPU and CON units provide totally reliable and secure connectivity to a wide range of broadcast equipment using a mixture of VGA, DVI, DisplayPort, serial, analog audio and USB data transfer. In the studio area, a similar set up was created with a Draco tera 64 port hybrid compact switch, providing identical functionality on a smaller scale. The switch was supplemented with additional point-to-point KVM extenders to provide dedicated links from operators to specific equipment.
The Media Operations Centre (MediaOp) utilises individual point-to-point KVM extenders carrying a range of DisplayPort, DVI, HDMI, RS232, analog audio signals and USB data transfer. In addition, a small Draco tera compact switch enhances the versatility of the installation, providing instant switching between sources for key operational staff requiring immediate access to a range of different sources. The instant, delay-free operation of the Draco tera KVM switches and extenders allows vision mixers and editors, producers and playout controllers to manage their operations without any distractions or interruptions. An impressive range of broadcast devices is made available to operators through the Draco KVM switches and extenders. These include Vizrt tools, Avid, Adobe, LAWO VSM and EVS production and editing devices, NRS teleprompters, radio scheduling tools and various robotic and computerised control devices. Bidirectional USB data capability ensures instant and responsive control of equipment though keyboard, mice, touch screen, pointing and other interface devices.

Connection to the switches and extenders from points around the facility was made using CatX and fiber cabling, depending upon the distance involved.

Radio production

In addition to the TV and internet broadcast services, Mediacorp also operates 13 radio stations delivering a mixture of music, news and other entertainment and information programmes. The radio production department has similar needs to the TV staff: they too need to access stored and live data in an efficient, convenient and comfortable working environment. Fiber optic cabling connects radio presenters and producers to source equipment over DisplayPort, DVI and HDMI connections, supplemented by RS232, analog and digital audio and USB 2.0 data transfer for large music files. To provide an ergonomic working environment, MSC (Multi Screen Control) functionality has been incorporated into the radio stations to allow radio announcers and DJs to work more efficiently. Each announcer requires just one keyboard and mouse to control several computers on individual monitors.

Workflow control through Lawo's VSM

Lawo's VSM (Virtual Studio Manager) Control and Monitoring System provides the overall control layer across the TV and radio facility. The VSM control system interfaces with all the Draco tera KVM switches to deliver flexible and speedy control of the connections from broadcast operators, production staff and engineers to sources feeding into the tera switches. This occurs at the same time as the VSM system is used to manage and control the broadcast workflow. The result is a fully integrated system that not only operates effectively and in the manner required by producers in their quest to deliver the highest quality TV and radio output, but is future proof and easily extendable and upgradable as requirements and equipment change in years to come.

Quotes

"We needed a system that would act transparently, so that operators could focus on their creative jobs and not have to consider the interconnection technology. Also one that is flexible in operation, secure and reliable, with redundant capability to cover any problems."
Wang Yin, Project Manager, Mediacorp Pte Ltd.

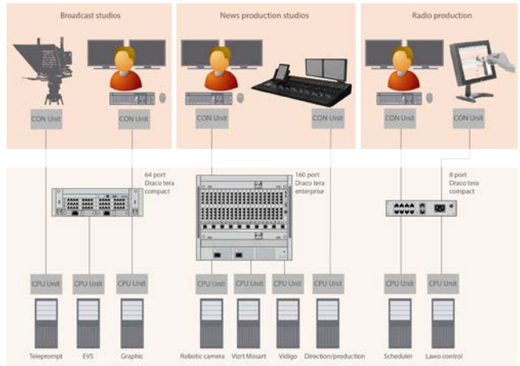
"The quality, performance and reliability of the IHSE Draco system is unsurpassed and enabled us to deliver a complete, fully integrated, solution that exceeded expectations."
Steven Cheng, Director at Broadcast Engineering Services.

KVM in Broadcast – Streamline the Broadcast Workflow

In today's fast-paced broadcast environment, the ability to instantly access essential equipment is crucial to every great transmission. IHSE Draco tera KVM switches allow operators, engineers and producers to manage any device from any workstation; delivering greater flexibility, increased efficiency and enhanced system security and reliability. Broadcast studios, OB vans and post production facilities around the world rely on Draco tera switches to connect and control vital equipment.

The Draco tera range of switches has key features that make it ideal for the fast-moving and pressurised broadcast environment; in fixed installations, live outside broadcast and in the post-production and audio and video editing industries:

- ***Instant connection and switching***
- ***Near-zero transmission latency***
- ***HD-SDI and USB 3.0 parallel switching***
- ***Artefact-free video and audio***
- ***Support of all digital and audio video formats***
- ***Integration with third-party controllers***
- ***Extensive redundancy and security options***
- ***In-band and out-of-band control and administration***
- ***Modular, expandable, future-proof***



Draco tera KVM switches for total connectivity

The Draco tera range extends from 8 to 576 non-blocking, assignable ports. With mixed operation over copper and fiber cables, the switches can handle all types of digital video up to 4K UHD resolution and analog and digital audio as well as SDI and USB 3.0. The Draco tera KVM switch delivers visually lossless transmission, instant connectivity and extensive configuration and redundancy options. Draco tera connects and switches users to remote CPUs and servers instantly; with no transmission delay or picture degradation. It is the ideal solution for today's broadcast facilities.

Trusted by broadcasters around the world

IHSE Draco tera KVM switches and extenders are used by TV and radio broadcast organisations, post production studios and music producers around the world. They all have one goal: to provide the best and most reliable output. Draco tera KVM switches and extenders help them achieve that goal.

Installed system components

Sources	*Operators*	*KVM equipment*
Viz-Artist, Mosart	Robotic camera control	K480-160 x 2 Draco tera enterprise switches
Lawo Configuration	Lighting	K480-48C64F Draco tera compact switch
NRS Teleprompter	Studio Director	K480-8C Draco tera compact switch
Graphic control	Vision Mixer	Draco Vario CPU fiber and Cat X extenders
Robotic camera control	Subtitling editor	Draco Vario CON fiber and Cat X extenders
VR Control client	Line producer	
Subtitling	Graphics editor	
Video Grabber	Technical Producer	
ChyronHego Vidigo	Teleprompt editor	
EVS servers	Social Media editor	
	Multicam control	
	Audio engineer	
	Vision engineer	

ihse KVM & Beyond
mediacorp
QVESTMEDIA THE LEADING SYSTEMS ARCHITECT

GENELEC - THE ACTIVE MONITOR MANUFACTURER

Genelec, the pioneer in Active Monitoring technology, is celebrating nearly 40 years of designing and manufacturing active loudspeakers for true and accurate sound reproduction.

Genelec is credited with promoting the concept of active transducer technology, which many manufacturers are just now incorporating into their products. Since its inception in 1978, Genelec has concentrated its efforts and resources into creating active monitors with unparalleled sonic integrity. The result is an active speaker system that has earned global acclaim for its accurate imaging, extremely high acoustic output from small enclosures, true high-fidelity with low distortion, and deep, rich bass.
Already at its very beginnings in 1978 Genelec has recognized the added value of high-quality design. Finally, the cooperation with renowned Finnish industrial designer Harry Koskinen began in 2000 and the collaboration between Genelec and Koskinen has flourished ever since.

Becoming an International Brand

In 1980 20% of Genelec's products were delivered abroad, in 1984 80% and in the 1990s it peaked to 95% but settled to around 90% in the 2000s. Since 2010 the domestic and international market has steadily grown and export now is around 80%. The first export countries were Italy, the Nordic Countries, Germany, the Netherlands, Austria and Great Britain. When celebrating the 10th anniversary the marketing area was 12 countries, and nowadays there are sales in more than 60 countries. At the same time as the export trade has been growing, the degree of domestic added value of the products has remained at around 80%.
In 1980 Genelec produced about 1Tsd speakers which has summed up to a total of more than 1Mio speakers by the end of 2016. A breakthrough for Genelec was the 77th AES convention in Hamburg in 1985. The 1022A was introduced successfully and Genelec Oy was the only manufacturer in the world who had a whole family of speakers: Biamp 1019A mini monitor, broadcasting monitors S30 and 1022A and music monitors 1024B and 1025A. By 1985 Genelec was producing 12 speaker models. Since 2013 there are about 30 basic active models in production and numerous modifications and versions of them for different applications and geographical areas underlining Genelec's status as "The active monitoring company" on a worldwide level.

The Headquarter in Ilsalmi

The other corner stone was the establishment of a new production building and HQ in Ilsalmi. The foundations were laid in January 1985 and the topping-out party took place on the 5th of July. The building area was 710m² with a floor space of 890m². There have been four expansions since then. The first expansion was finished in March 1993. The production line got some 840m² of extra space. The second expansion began 1997and was finished in the same year. The third expansion was completed in summer 2001 and the fourth in autumn 2005. In addition to production area this expansion included more premises for training and quality listening. The most recent change was in 2009 when the whole heating system was changed to district heating.
The ISO 9001 quality certificate and the ISO 14001 environmental certificate demonstrate that Genelec meets the international standards and that the operations are regularly verified by third party certification bodies. The environment is as important for Genelec as profitability. Financial success cannot mean endless waste of natural resources and products which last for decades mean less useless waste. At the same time the distribution logic has changed. Product information is downloaded from the web and the physical product is purchased where it is most economical. Web forums share rapidly user experiences. This has set distributors to a new and different position, as they are no more the only source of information. Genelec is updating its website continuously and offers comprehensive services to users. It is easy to see that electronic business and information sharing is increasing while the role of hardcopy brochures is shrinking.
05, 06, 07 Production of the Genelec Loudspeakers in Ilsalmi

The #1 Speaker in Mobile Units

Already in the very early days Genelec sold their speakers into the mobile production units of YLE. Today Genelec dominates this market with more than 60% and has accompanied the OB Truck companies from SD (Standard Definition), HD (High Definition) to UHD (Ultra High Definition) video and IP by delivering the 8430A as the first studio monitor enabling direct monitoring of audio-over-IP streams, and the first to support AES67 and RAVENNA standards. Also, digital signal processing and software control are present in the new Products, and their role is growing. The monitors have lots of advanced technology, and new software enables building intelligence in to a speaker. A speaker recognizes its environment and adapts to it. This is of course an advantage for the calibration of the quite small sound areas in OBVans.

Also, digital signal processing and software control are present in the new Products, and their role is growing. Genelec monitors have lots of advanced technology, and new software enables building intelligence in to a speaker. A speaker recognizes its environment and adapts to it. These monitors with intelligence (Smart Active Monitors – SAMs) again have cemented Genelec's position as a pioneer of new speaker technology.

The Genelec Loudspeaker Manager

Recently Genelec released GLM (Genelec Loudspeaker Manager) V2.2. Of major importance to early adopters of Genelec Smart Active Monitors is GLM V2.2's inclusion of Distributed Bass Management Filters for legacy Smart Active Monitoring products including 8240, 8250, 8260 and 1238CF models. These filters now provide seamless integration with the new 7300 range of Smart Active subwoofers.

Other firmware updates are included for every other model of Smart Active Monitoring product, as well as the GLM 8300-416 Network Adapter. The firmware updates are directly available through the GLM Acoustic Editor pages.

"The Ones" – Ultimate Point Source Monitoring

In May this year Genelec introduced Ultimate Point Source monitoring with "The Ones": in this series, the award-winning 8351 three-way Smart Active Monitor™ is joined by the new 8341 and 8331, the world's smallest three-way coaxial monitors, to create a complete compact coaxial range that redefines near-field monitoring. Recently unveiled to a VIP audience at London's Metropolis Studios, the 8341 and 8331 immediately defy expectations; housed in enclosures no larger than a traditional two-way Genelec 8040 or 8030, they wipe away the previous constraints of coaxial point source setups.

"The Ones"' deliver absolutely neutral reproduction, meaning users can make mix decisions with confidence while also listening for longer sessions – the dramatic reduction in unnatural imaging means listener fatigue is a fraction of that experienced with other systems. In addition, Genelec's famous Directivity Control Waveguide (DCW) is combined with the unmatched precision of "The Ones" concealed dual woofer design, resulting in less coloured reflections.

Like the 8351, both the 8341 and 8331 can be orientated horizontally or vertically using an adjustable IsoPod™ base for isolation, with absolutely no compromise in performance, offering maximum flexibility to fit even the tightest of working environments. But while the 8341 and 8331 both echo the 8351 in form and function, the new models have been entirely reengineered to meet the challenges of their ultra-compact dimensions.

Especially in the available space in OBVan sound areas the coaxial design allows for ultra-near-field listening, creating a dramatic improvement in the direct sound-to-reverberant sound ratio and further reducing the room's influence while monitoring. The listening distance may be as short as 16 inches, with no loss of precision. At a listening distance of just 20 inches, the maximum SPL capability (headroom) is raised by more than 5 dB.

Finally, with The Ones, Ultimate Point Source meets the flexibility with Smart Active Monitoring™, the ground-breaking Genelec technology based on GLM™ 2.2 software for PC and Mac, incorporating AutoCal™.

"The number of big ideas contained within these small monitors is truly remarkable, but no list of features can ever match up to the experience of simply listening to them," commented Genelec Managing Director Siamäk Naghian. "For professionals worldwide, the 8351 has already become the trusted standard for its neutrality and its smooth frequency response both on- and off-axis. Now that same precision and three-way performance is available to everyone. With the 8341 and 8331, the size of your studio is no longer a barrier to the size of your ambition."

Siamäk Naghian, Managing Director at Genelec

DRIVING IP BASED LIVE TV WITH CELEBRO MEDIA

Celebro Media specialises in live production, providing studio space, galleries, uplink facilities, staff and everything required producing and transmitting live content. The rapidly growing studio facility has five studios at its central London location with further facilities in Moscow. By Autumn 2017, Celebro Media will have completed works on an additional five studios in London and two in New York. Also, its has recently begun trials of a new OB service that allows multi camera switching down a single transmission line. The service is currently being offered to international broadcaster on a trial basis.

Global broadcasters such as BBC World Service, MTV and TRT World all use Celebro Media's studios. As a UK company with firm roots in Russia, it has an excellent track record and experience of helping some of the biggest names in TV and film work abroad with major media and broadcasting players.

Wesley Dodd
Chief Executive of Celebro Media

"We pride ourselves in being the leading broadcast consultancy with advanced 4k TV studios worldwide," comments Wesley Dodd, Chief Executive of Celebro Media. "The team at Celebro work closely to consult broadcasters on IPTV, broadcast strategy, commercialisation, editorial and technical services, plus access to transmission networks and a diverse catalogue of media content. We truly offer the whole live production package."

The only way is IP

Having previously invested in NewTek's TriCaster Advanced Edition live production solution that helped TRT World to continue reporting via Facebook Live during the 2016 Turkish coup attempt, Celebro Media fully trusted NewTek's range of IP solutions. The TriCaster Advanced Edition enabled TRT World to produce and stream live news reports from its London journalists via Facebook Live within a very short space of time, and later to stream to YouTube and the TRT World website. As events progressed the team was able to receive additional video reports from around the world, including Istanbul, and incorporate them into the live stream. This 'emergency transmission stream' rolled for approximately 15 hours, until the channel was able to get back on air in Istanbul.

"There was very limited connectivity in Turkey, so TRT World's Facebook Live stream was something of a lifeline. The social media element also provided a way for people to communicate - there was a huge level of engagement with tens of thousands of people watching live, and then on catch-up later," comments Dodd.

"TriCaster Advanced Edition and Facebook Live enabled us to keep people informed during an important world event. We do a lot of streaming on Facebook Live, and with the TriCaster Advanced Edition's live streaming capabilities, it was the obvious option."

Having had great success with the TriCaster Advanced Edition coupled with Celebro Media's rapid expansion, Wesley turned to NewTek and its IP Series to significantly increase the studio's scalability to accommodate the company's growth plans.

Flexible growth

Offering unparalleled efficiency and flexibility, the NewTek IP Series was installed and allowed Celebro Media to usher in a new paradigm of production workflow, based upon NewTek's software-driven live production technology. Now at the heart of Celebro Media's operations in Oxford Circus, the IP Series' modular approach to production systems has delivered virtually limitless access to video sources and video mixing possibilities. The IP Series is a true hybrid platform providing full backwards compatibility with traditional SDI equipment.

Video, audio, control signals, metadata and tally signals are all transported digitally using NewTek's NDI™ technology that creates a fully customisable IP workflow solution with limitless scalability. Furthermore, the IP Series' modular approach to production systems delivers virtually limitless access to video sources and video mixing possibilities.
Jahlene Joseph, Head of Studios at Celebro Media Group, said; "The extraordinary flexibility of NewTek IP Series means we can push video content around our building using NDI - giving us unparalleled control over how our clients can view, ingest and manage live video streams."

Offering more configurations and a more complete set of capabilities, Celebro Media found no other solution that would enable complete unified production workflows to the scale and scope of the NewTek IP Series.
Both TriCaster and IP Series are absolute powerhouses, providing a 'complete production environment'.
By embracing a software based production solution like the IP Series, Celebro Media is now also able to offer uncompromised 4K UDH services through a single upgrade. This has enabled Celebro to embrace further production workflow efficiencies keeping all clients happy.

Talking TalkShow

To further enhance the facility's offering, Celebro Media has also invested in several TalkShow VS 4000 systems that offer professional, multi-channel video calling for both SDI and IP workflows. The TalkShow system enables Celebro Media to conduct multiple live, production-ready Skype video calls simultaneously during a broadcast.
The NewTek TalkShow VS 4000 integrates multi-channel video calling to enable instant connection and live interaction online via Skype. This allows presenters to facilitate compelling conversation and in-depth discussion between multiple remote guests in real time regardless of location. TalkShow VS 4000 takes advantage of Skype TX 4 from Microsoft.

"The TalkShow system enables us to cost-effectively connect a reporter in the field, industry experts, pundits, politicians or the viewing audience from anywhere in the world to the news studios using an internet tool that is easily available to all," says, Dodd. "This means everyone can become a spokesperson in real-time for breaking news around the world."

Celebro Media has taken the use of TalkShow to another level. "We're using TalkShow to link up TV Studios in different parts of the world to provide multi-views from one studio location to another. It provides a way of sharing a gallery stack between studios and even countries, which is amazing," comments Dodd.

The future

Celebro Media believes that IP is changing the way journalists can get a story on air. For a lot of news broadcasters it is much faster, easier and cheaper to create a programme. IP also enhances the viewer experiences making it a much more immersive and interactive form of media.
Wesley explains, "I am a massive fan of IP based solutions for broadcast. It reduces the masses of cabling usually needed to produce a programme and you can control what is happening by a simple click of a mouse. With the IP solutions we have in place, the team here can build a complete gallery in just one day."
"The next generation of TV viewers want to receive programmes, especially news, in a different way. Content is not being delivered just through the television, but now through various social media channels and we need to adapt to help broadcasters deliver this," continues Dodd.

As Celebro Media grows worldwide so will its investment in NewTek's IP Series.

CELEBRO MEDIA

NewTek™

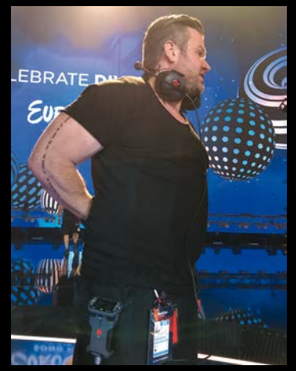
NDI Network Device Interface

Riedel Provides Massive Broadcast Infrastructure for Eurovision Song Contest

For the 12th consecutive year, communications and signal distribution solutions from Riedel played a starring role in the Eurovision Song Contest, the world's longest-running international television song competition.

Riedel's MediorNet real-time media network provided the redundant and decentralized signal routing and transport infrastructure from start to finish of the production, broadcast live from the International Exhibition Centre in Kiev, Ukraine in May. Plus, TETRA digital radio systems along with Riedel's all-new Bolero wireless intercom system was relied on heavily for all crew communications, only six weeks after it was introduced to the market.

Broadcasted every year for 62 years, the Eurovision Song Contest is one of the most-watched non-sporting events in the world, with a current estimated global audience of more than 600 million.



For all three broadcasts, including the two semifinal shows and the finals competition, Riedel supplied a robust, fiber-based communications backbone for its partner NEP Sweden AB, which produced the show's world feed on behalf of EBU and the Public Broadcasting Company of Ukraine – UA:PBC, and also deploying the recently launched MediorNet MultiViewer. Riedel supported the event with a 25-member onsite engineering team.

"This year we once again turned to Riedel to ensure that we could pull off this immensely popular — and exceedingly complex — live production without a hitch. And once again, Riedel came through for every aspect of the show, from stage presentations to commentary and backstage interviews," said Ola Melzig, Head of Production at ESC 2017.

"The versatility and quality of the Riedel equipment, backed with the expertise of Riedel's superb engineering team, helped us to make the 2017 Eurovision Song Contest a huge success."

Ola Melzig
Head of Production at ESC 2017

The Riedel MediorNet backbone consisted of four MetroN core routers and dozens of MicroN high-density media distribution network devices in a mesh topology. This decentralized configuration ensured full redundancy of all video and audio signals for commentary, intercom, signal distribution, and radio communications, including the feeds for monitors in commentary booths and for displays and projectors in the International Exhibition Centre. 40 commentary booths for various countries were equipped with Riedel Artist digital matrix intercom CCP-1116 commentary panels.

The Riedel network linked numerous other production components including critical control points for sound, lighting, and pyrotechnics. In all, more than 150 comms panels and 600 analog and digital TETRA radios were used for the show. As with last year's production, NEP Sweden AB's HD1 OB van was likewise equipped with Riedel MediorNet and Artist digital intercom components.

In addition, DECA, a Riedel subsidiary, provided an access control system that simplified guest and crew entry into the arena, boosting security and providing efficient visitor management. The system required personnel to pass through turnstiles where their accreditation cards, embedded with RFID chips, were swiped with stationary or wireless reading devices, and the RFID data was matched to an online database.

Working with partner TPO, Riedel also provided a comprehensive IT infrastructure, including all switches, servers, and wireless access points, for up to 3,000 journalists in the press center.

Photo credits: © Ralph Larmann

"The organizers and producers of the Eurovision Song Contest are continually looking for ways to raise the bar and create an even more spectacular program, and 2017 was no exception," said Benedikt Leister, Project Manager at Riedel Communications. "With our MediorNet real-time media network providing a robust infrastructure, this year's show was a remarkable and memorable event. We are always pleased to play a role in this unique production, and we look forward to supporting further innovation as the contest continues to grow and evolve."

RIEDEL

NEP EBU UA:ПЕРШИЙ

ROBE FUNKS IT UP WITH BRUNO MARS

Seven hundred and ninety-five (795) Robe Spikies are on the road with the incredible Bruno Mars 24K Magic world tour – setting a record for the largest number to date of a single type of Robe fixture on one touring show!

The Spikies are the main lighting feature of an action-packed show and are used constantly for hi-impact looks, an array of fluid effects, mesmeric chases, animated chunks of color and magically twinkling and sparkling 'soft' surfaces which can totally transform the appearance of the performance space in this exciting hi-energy show.

The dynamic, colorful and highly visual production design was originated by Leroy Bennett of Seven Design Works, who collaborated closely with a top creative team including lighting designer Cory FitzGerald and lighting director on-the-road Whitney Hoversten.

24K Magic is also currently one of the most talked about live shows of the year by the multiple Grammy award winning artist, following the release of his hugely successful third studio album of the same name at the end of 2016.

The worldwide lighting contractor is VER who made the massive investment in Spikies which were delivered by Robe North America.

It is a big and beautifully balanced visual collage of lighting and video – with live (IMAG) video director Steve Fatone cutting the camera mix, combined with eye-catching playback content produced by Empirical Studios. Bruno Mars himself was integrally involved with the evolution of the stage presentation, and he and his incredibly talented band also provide the final ingredient in this entertaining molten mix of intelligence, fun, wit ... coupled with some awesome technology and imagineering!

Cory - who has worked with Bruno Mars since the 2011 'Hooligans in Wonderland' tour and enjoys a great working relationship and dialogue with him - and Roy's brief from the artist included references to a wide array of memorable shows. These included the huge iconic PAR can rigs of the 1990s that graced the stages of legendary artists like Queen, Michael Jackson and AC/DC. "Bruno wanted power to the lighting as well as a clean stage and the feeling of an environment or room .. in which he was playing" explained Roy, "which inspired the synthesis of Versace showroom vibes and these massive retro lighting rigs." So the show aesthetic is based on all these parameters plus the seating being sold to 270 degrees.

To recreate the wall of lights effect in a thoroughly contemporary context they needed a fixture with the right appearance that could also produce the diversity of effects required to keep the looks pumping throughout the hi-energy 2-hour show. The 16 action packed numbers embrace a plethora of musical styles and genres.

The fixture they sought needed to be lightweight enough to be practical on tour ... and with that many on the rig and a lengthy itinerary already confirmed, it needed to be robust and reliable.

Several shoot-outs and tests were conducted to 'audition' fixtures explained Cory, revealing that the "unified look of the beam in the lens was a huge part of the Spikies winning out." He also said that their speed was a big factor in addition to the 360-degree rotation, together with their multi-functionality and the flatness of the color field. On top of that, effects like the prism and the flower "really make them unique in their class."

Roy added, "The Spikies were chosen for their versatility, speed and compact size ... I wanted to pack as many units as possible into the pods!"

Three hundred and seventy-five (375) Spikies are built into five upstage columns, and the other 420 are contained in 20 moving overstage pods, all constructed by TAIT together with the automation systems to move them.

The five back columns are each loaded with a 5 wide and 15 fixtures high matrix of Spikies, and the reverse side of the column is covered in an RBG LED 'lightbox' paneling material for contrast. They rotate to reveal the different sides throughout the show.

A large LED video screen also flies in at certain points just downstage of the columns, and at times this is lit through with the banks of Spikies, producing another dimension to the stage.

The 20 Queenesque pods over the stage are rigged in a five-wide-four-deep configuration, each loaded with a 7 x 3 Spikie format utilizing 21 fixtures per pod, and these move into a series of different looks throughout the set.

These moving Spikie columns and pods provide a huge scope to change the appearance and ambience of the stage and are used constantly throughout the show, each time bringing a totally new perspective to the space, matching the diversity of the performance.

For transportation, the Spikie pods and columns are de-rigged, have protective cover boards and wheels added and are rolled up the truck ramp – a swift, compact and straightforward exercise and a neat solution in part facilitated by the light weight of the lights. Some serious programming – on a grandMA2 full size - went into the equation. This was undertaken mainly by Cory assisted by Whitney and also Davey Martinez during the three weeks of production rehearsals at Rock Lititz Studio in Pennsylvania. Cory commented that it's a testament to "the fixture and its flexibility" that they can get a whole show simply by programming different looks and movements with uniform pods of lights.

Seven Robe BMFL Spot fixtures are utilized for key lighting all the performers onstage. A VER lighting crew of 6 is teching and rigging all the kit on the road, crew chiefed by Soline Velazquez. The tour's production manager is Joel Forman.

The 24K Magic tour continues to WOW crowds the U.S. until November before visiting Latin America at the end of the year. It's then scheduled to play New Zealand and Australia in February and March 2018.

ROBE VER

SPONSORING

AN UNUSUAL MUSICAL: THREE MIXING CONSOLES AND AN AUDIO NETWORK MAKE LUTHER'S THESES AUDIBLE

500 years ago, German professor of theology and monk, Martin Luther, began the Reformation in Germany which would fundamentally change the face of Central Europe. Tradition has it that he posted his Ninety-Five Theses on the door of the All Saints Church in Wittenberg on 31st October 1517. Half a millennium later, Germany is celebrating the Lutheran anniversary year with a specially composed work titled Pop Oratory Luther – The Project of a Thousand Voices. It was written by two famous German musicians, Dieter Falk (composer and producer) and Michael Kunze (lyrics). The Pop Oratory premiered on Reformation Day in 2015 to an audience of around 16,000 in a large Dortmund stadium, and has been touring major Germany venues since early 2017. Representing a contrast between a highly professional production and a desire to avoid commerciality, it overturns familiar concepts and conventional approaches to equipment.

An unusual production

The musical team comprises a choir, a 40-piece symphony orchestra, a rock band, twelve solo musical stars, three conductors and around 100 backstage staff, some of whom are volunteers. The choir is by far the most spectacular aspect of the production: at every venue, up to 3,000 local singers are selected to form the project choir anew. Not only is it massive but each performance consists of different singers, all of them laymen. This makes every performance something of a premiere, posing new technical challenges every time. Then there are the other changes to consider, which each venue introduces. Performances take place in very large halls, usually indoor stadiums.

The Pop Oratorio is not predominantly a commercial venture. Rather it is the brainchild of a Church association's initiative backed by an enormous volunteer effort. Event tickets are low-priced deliberately in order to attract a wide and diverse audience. Evidence the project comes from the heart, from a deep conviction, and is not about making money.

Mixing consoles and audio network as sponsorship

One of the best ways to keep costs low is to find sponsors. Rich in cultural prestige, this is an ideal project for sponsors to support. A view shared by Stage Tec, the Berlin based manufacturer of mixing consoles and routers, which happened upon the Oratory by chance in conversation with Dieter Falk. "The idea to cooperate was spontaneous", recalls Alexander Nemes, Head of Sales at Stage Tec. "Dieter Falk, and particularly Carsten Kümmel as the leading sound engineer, as well as the technical crew, were delighted at the prospect of working with Stage Tec mixing consoles based on a digital NEXUS audio network." Now, Stage Tec has become involved in the Pop Oratory as a sponsor on a large scale. Three mixing consoles with fully equipped DSP and a distributed audio network with eleven Base Devices represent a value of about 700,000 euros. Add to that the manpower for setting up the project and supervising the routing during performances. "For us this sponsorship is exciting because, much like in theatres, opera houses and commercial musicals, it is an opportunity to showcase the strengths of our equipment perfectly", remarks Alexander Nemes.

"I'm delighted about Stage Tec's support. The extraordinarily versatile configuration of the eleven NEXUS Base Devices gives us maximum flexibility to adapt spontaneously to the specific requirements of each arena", says Carsten Kümmel.

"Furthermore, the NEXUS system combined with the AURUS consoles also gives us the utmost freedom and options during the operation and interaction of the four mixing desks, which was simply not possible with the previous products."

How do you record a huge choir?

Up to 3,000 singers form a massive choir. Even so, their voices are not strong enough to fill the large halls unassisted. A sports stadium is no opera house! Carsten Kümmel had a previous opportunity to test various microphone scenarios for large, sprawling choirs in an earlier production, The Ten Commandments. For the Pop Oratory, he chose a setup of several MS stereo arrangements, combining each with a cardioid microphone for close pickup. The main MS microphones consist of an AKG C414 in figure-of-eight mode for the side signals and a Sennheiser MKH416 short shotgun for the middle signal. Carsten Kümmel would have liked to use Microtech Gefell's KEM970 cardioids for the closer singers. However, it is almost impossible to rent them and so he chose Neumann KM 184 for his cardioid mics instead.

Without the additional cardioids, the arrangement had lacked presence and quickly resulted in feedback. "Our goal was to cover as much of the choir as possible using as few cables and microphone positions as we could get away with", explains Carsten Kümmel. Depending on the venue, the number of MS arrangements varies, featuring up to 13 systems, maybe even more at the most technically sophisticated performance in Berlin.

Network-integrated splitters

The choir microphones feed into five Nexus Base Devices right on the stage. With no prior analogue amplification, the analogue microphone outputs are digitally converted at 32-bit resolution and 158 dB(A) S/N ratio and are then available to all mixing consoles in the network simultaneously. A 32-fader AURUS platinum acts as the main FOH mixing console, supported by an adjacent 16-fader AURUS platinum for mixing the soloists. A compact 16-fader AURATUS takes care of choir monitor mixing as well as in-ear monitoring for the band and conductors via a Digico SD7 connected via MADI.

Integrated splitting is a special feature of the NEXUS network and in particular the microphone input boards. Not only can Carsten Kümmel set the preamplifier for each microphone from his FOH position, but each of his colleagues undertaking the monitor and soloist mixes can do likewise – independently of each other and without affecting the others' settings. "If we were not using a NEXUS network, this would usually require external splitters, which we can now do without", comments Alexander Nemes.

NEXUS networks can be built with different topologies. In order to keep cable runs short, the Pop Oratory features a combination of a double star and serial network. Depending on where the choir is positioned –, in the galleries behind the stage, over several levels or grouped on one level, depending on the venue – more NEXUS Base Devices are arranged in series or connected as a star to the central NEXUS Star Routers at FOH and the stage. Flexibility was an important criterion from the outset, in order to be able to adapt the topology to each hall layout and choir size.

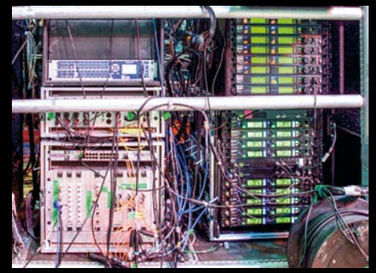
Speed of light

Analogue cable runs are kept short deliberately in this production. Thanks to the many NEXUS Base Devices, which act as stage boxes for the orchestra, band and wireless connections, the distances from the microphones to the network are manageable. The same approach is employed at the output by placing NEXUS Base Devices near the amplifier racks. All signals within the network are transmitted over fibre-optic cables. This makes them interference free while transmission at the speed of light reduces cable latency to a minimum. This means that signal delays are minimal even in the largest halls.

Plenty of options

Sophisticated microphone arrangements are not a privilege restricted to the choir. Orchestral instruments are picked up twice, once with a conventional Neumann KM 184 and once with a DPA 4099 clip microphone for loud passages. This setup allows the instruments to be heard more clearly, although Carsten Kümmel only ever uses one microphone type at a time. Then there are the band's signals and the communication paths, which are also sent via the network and mixing consoles. Between 120 and 150 channels converge in the mixing consoles, give or take a few depending on the venue. External effects devices complement the equalisers and dynamic functions built into the consoles. Sending to the effect devices, possible conversion, and return all result in delay. It is very short in comparison with the long acoustic delays in the halls, but is compensated nevertheless. The built in delay in each AURUS platinum channel is used to delay the channels without external effects by 4.5 ms.

The console also offers several convenient automation options, ranging from the scene automation popular in musicals and theatres to dynamic automation. The latter is also well-suited to live production, since many complex productions already run to Timecode. However, the team decided to use purely manual operation for the Pop Oratory, which works quickly and efficiently on the AURUS consoles thanks to their many rotary encoders, buttons and rapid access.



In short order

"We go into a hall in the morning, and by the evening we are doing the sound check. The next day the choir arrives, dress rehearsal is in the afternoon and then comes the evening performance", says Carsten Kümmel. Short lead times help to reduce costs. Easy to set-up and immediately operational, Stage Tec components facilitate this tight schedule just as much as the compact sound reinforcement system, designed to be installed in as few positions as possible. Even so, it requires an enormous effort: As an example, twelve Meyer Sound UPA12 full-range speakers are mounted above the choir just for their monitors. The short preparation window is where the productions' true challenges lie, according to Carsten Kümmel.

Around half of the performances scheduled for 2017 have already been completed successfully in Hanover, Stuttgart, Düsseldorf, Mannheim, Hamburg, Munich and – on a smaller scale for a change – the EU parliament in Brussels. Five cities are still to come before the three mixing consoles and audio network return to Berlin. "We are delighted that our equipment has helped create the perfect audio illusion for more than 200,000 people", concludes Alexander Nemes. "For us, the project is proof that our digital workhorses have acquitted themselves one hundred percent, even on such a big scale in such large halls."

A NEXUS network is an audio network based on time division multiplexing TDM.

It consists of individual Base Devices, which are installed exactly where audio, control and or other signals are to be fed into the network or supplied by it. Fibre-optic cables interconnect all Base Devices digitally and potential-free. Each Base Device is an autonomous local router. Thus a NEXUS network has distributed intelligence including distributed control information and cross-point data.

Each Base Device is individually equipped with exactly the interfaces and modules required at a given network node. Because all Base Devices are interconnected, all sources throughout the network can be switched to any destinations irrespective of their input or output formats as well as their physical location in the network. Elaborate and expensive format conversions have become a thing of the past.

NEXUS is also host to the processor boards for the AURUS, AVATUS, CRESCENDO and ON AIR flex mixing consoles.

STAGETEC

AURUS platinum is Stage Tec's flagship digital mixing console product

With an unusually large number of physical controls it provides users with all the essential information – no browsing or scrolling necessary. Multiple assignments are no longer required.

AURUS provides users with the greatest possible functionality and flexibility with outstanding sound quality. Features include: true multi-channel capability for parallel mixes in 5.1 and stereo as well as mixes up to 7.1, extensive control options for shows and events, and a variety of static and dynamic automation options. The high-performance audio DSP unit platinum DSP (RMDQ) equips the console with huge processing power. AURUS platinum now offers over 800 audio channels, making resource intensive production formats such as 7.1 mixes with 128 sum buses at 96 kHz easy to implement.

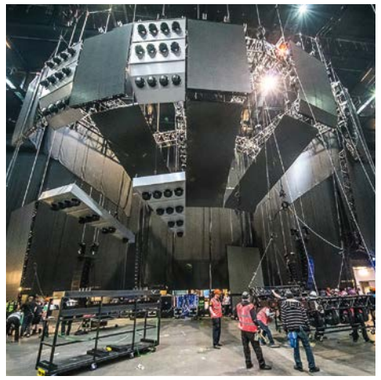
The Pop Oratory Luther

The Creative Kirche Foundation in Witten, in Germany's Ruhr area, initiated the 'Pop-Oratory Luther – The Project of a Thousand Voices' on the occasion of the 500th anniversary of Luther posting his Ninety-Five Theses. It was written by Dieter Falk (German composer) and Michael Kunze (singer). In partnership with the Evangelical Church in Germany (EKD), the Oratory is being performed in many cities throughout Germany in 2017, including Berlin, Düsseldorf, Halle, Hamburg, Hanover, Mannheim, Munich and Stuttgart.

ED SHEERAN TAKES SENNHEISER, CLAYPAKY AND GRANDMA AROUND THE WORLD

Ed Sheeran has always enjoyed huge popularity, but with ÷ (Divide) having dominated the international album charts since its release and the accompanying ÷ Tour selling out the instant dates were announced, it has never been higher. The tour began in Europe in Italy's Turin in March, travelling to Switzerland, Germany, Sweden, Denmark, the Netherlands, Belgium, France and Spain before heading to the arenas of the UK and Ireland. It has worked its way round South America, Central America and Mexico in May and June, then back to the UK before heading over to the US.

The impressive lighting and scenography design which is helping Sheeran wow the crowds and impress the critics ... has been created by Mark Cunniffe and for which a substantial Kinesys automation system was specified to assist with the daily stage set build and to facilitate the movement of lighting pods during the show. The Kinesys system and control, the lighting system as a whole including Claypaky Mythos2 and Scenius Unico fixtures together with grandMA2 / MA NPU was recommended by Mike Oates, director of UK based Lights Control Rigging (LCR), and the tour's lighting equipment and crew supplier in combination with SES in the U.S.



It has been purchased by audio, rigging, motors and automation supplier, Salisbury based Major Tom Ltd., and is being co-ordinated on the road by Steve Bliss and operated by Omar Franchi from the rigging crew. All the tour's production elements are being overseen by production manager Chris Marsh. Steve's first job of the day is assisting the other lighting crew in building the mother-grid, which weighs a hefty 11 tonnes before being loaded with any kit! This is lifted using 30 x 2-tonne single-reeved chain motors each fitted with a 4.75T Kinesys LibraCELL for full monitoring and controlled via the Kinesys DigiHoist Plus intelligent hoist controllers.

The mother grid is pre-rigged with 47 of a total of 52 x 1 tonne chain motors (five are hung daily) which are each fitted with encoders for full positional control, and these are controlled by the 8 x 32A Kinesys DigiHoists. These sub-hung hoists control lifting the lighting and video elements into place during the build.

That comprises five curved video screens (crowns); four lighting crowns which sit in between each video screen and five video screens dubbed 'the ceiling' which sit horizontally above the stage that have triangular lighting "pods" filling the gaps. Additionally, there are five video screens making up a back wall and giving a continuous 'flow' of video surface from the top header, through the 'ceiling' and down the back finishing at stage level where the video angles back on to the stage. The show is all run complete-

ly 'live' in the true spirit of the artist, who likes to have the freedom of changing his set spontaneously, which keeps the show crew constantly on their toes whilst ensuring that each performance is unique and special for fans. The media servers running the playback video material are triggered from the grandMA2 which is configured to provide with a series of 'stab-buttons' that fire assorted lighting and video cues that are used as accents throughout the show.

Ed is once again using Sennheiser's flagship Digital 9000 Series microphone system and 2000 series wireless monitors, supplied by production company Major Tom. Chris Marsh, Ed's Production Manager, as well as front-of-house and monitor engineer, has been with the singer for six years and has an intimate understanding of what he wants and needs. Ed has been using Sennheiser microphones from the very start and switched to Digital 9000 during his 2014 US tour for his vocal, loop vocal and guitar. "We had Ed's guitar on a cable and DI for four years, because I simply couldn't find a wireless system that gave us the sound that we needed to deliver his performance," Chris explains.

"On first listening to the 9000 system, we discovered it was the most transparent sounding system we had ever heard. We were only meant to be checking it out on a soundcheck, but Ed and I both agreed we had to use it that night, and we have ever since."

Four mic channels are dedicated to Ed's acoustic guitars, one channel for electric guitar and three channels for vocals – main, spare and loop vocal. "For the loop vocal I use an MMD 945 super-cardioid capsule," says Chris. "As this vocal gets looped and repeated throughout the songs I can't risk there being too much background noise, so the tight pickup of the 945 is perfect.

"Ed's main vocal is a cardioid MD 9235 dynamic capsule which captures a lot of detail. Importantly, it copes very well with being handled heavily and cupped a lot, which is Ed's style. I use the Sennheiser 2050 wireless in ear monitors as they are rock solid, which is all that really matters to Ed."

"Sennheiser has a long-standing relationship with both Chris and Ed," says Jack Drury, Artist Relations Manager for Sennheiser. "We're delighted that Digital 9000 has proved to be the perfect choice for him, both in its performance and its robustness for his demanding tours."

"Sennheiser has been very supportive of us," Chris concludes. "There have been times where we could not ship our rig, or were flying in to perform one-offs and they have always helped me source the equipment I need and been on hand for technical support 24/7."

Sheeran closed the 2017 Glastonbury Festival in the UK in spectacular style with a show-stopping performance, headlining Sunday night on the Pyramid Stage in his only festival appearance of the year and now embarks on the first US leg of the tour. It visits the Far East and Asia in October and November and there are a record-breaking 19 stadium shows currently booked in New Zealand and Australia for March 2018.

Photos: © Ralph Larmann

SENNHEISER CLAYPAKY AN OSRAM BUSINESS grandMA2 KINESYS

CTV Partners with SAM for the World's First UHD Broadcast of a Major Music Festival

The Isle of Wight Festival

The Isle of Wight (IOW) Festival is the first major event that sets the UK Music festival season into motion. In its early years, it played host to such leading lights as Bob Dylan, Jimi Hendrix, The Doors, Leonard Cohen and Joni Mitchell. Since the festival's revival in 2002, it has stayed true to its heritage of drawing some of the biggest acts in the music business. Headliners have included everyone from The Who, Robert Plant and the Rolling Stones to Paul Weller, Stereophonics and Pearl Jam.

For the 2017 IOW festival, held at Seaclose Park in Newport and hosted by Edith Bowman, Maya Jama and Ricky Wilson, the Kaiser Chiefs front-man, production company CC Lab planned an image upgrade – quite literally

Moving to a UHD Production Workflow

With a line-up of headline acts such as Rod Stewart, Run DMC, Arcade Fire and David Guetta, this year's event upped the ante as it became the first major music festival to be broadcast in both UHD and HD with 5.1 audio. Across the four days of the festival, four hours of UHD content every night was on offer to satellite service subscribers. For those viewers without an HD subscription, content was offered via the regular SD channel and also available for access via the broadcaster's VOD service. This move to UHD was not without its challenges – it was decided that coverage of the event would be transmitted 2160/50p, which had implications for everything from the production workflow to storage.

Back in January 2017, UK-based OB company, CTV, which has worked on the IOW Festival many times in the past, provided a quote to CC Lab for the supply of HD facilities. When CC Lab decided to change the program format to UHD, a general tender was issued for the provision of UHD OB facilities, for which CTV again put forward a bid. As Hamish Greig, CTV technical director explains, "After a very challenging and competitive bid process I'm glad to say that CTV was awarded the project at the end of March."

According to Greig, the main challenge associated with the switch to UHD was twofold: first, the CTV team had to put together the workflow required to record two stages, while delivering live UHD and HD coverage. Second, they had to find a way of dealing with the sheer amount of storage needed to handle all the UHD feeds.

LiveTouch makes its mark

After considering the options, CTV decided on a new replay and highlights workflow, built around SAM's LiveTouch ultra-fast live replay and highlights system to support this first ever UHD production of the IOW Festival. The system replaced the legacy EVS workflow that had been used in previous years. The flexible and intuitive nature of the LiveTouch system meant that it was quick for operators to learn, and also provided a fast and easy way to drop signals in and out. As Greig explains, SAM's LiveTouch was selected for its ability to deliver a fast turnaround workflow and for the networking capability that it offers. "First, [The LiveTouch] systems joined together and networked really easily and secondly, the Rio editing capability was advantageous. The native XAVC support offered by the LiveTouch and way that it interfaces with the Rio editor meant it was very fast to drop in shots almost live," he adds. While most replays in sports – where LiveTouch has made its mark – are done at 1080/50i, the way the festival coverage was kept in 2160/50p was unusual. According to Greig, this was seen as the more sensible option as content from multiple stages was edited and delivered in quick-turnaround packages as opposed to the more common instant replays used in a live sports context. Although 2160/50p can be awkward to edit with, as Greig explains this is offset by the fact that the storage requirements are significantly reduced. This is thanks to SAM's FrameMagic media management technology which means no duplication is required when trading projects between replay and edit.

Selecting SAM's multi-format Kahuna switcher

Led by CTV's onsite Technical Producer Bill Morris, CTV dispatched OB2, one of its fleet of new 4K/UHD trucks, and its MTV5 unit. The trucks arrived on the Tuesday before the event kicked off, allowing the technical rig set-up to begin on Wednesday, ready for a rehearsal and transmission test on Thursday evening before going live on Friday.

OB2 was used to handle audio, vision engineering as well as the two main production areas covering Presentation and Stage 1, respectively. The truck is kitted out with SAM's Kahuna 9600 production switcher featuring its unique FormatFusion technology, external high-quality SAM UHD up and down converters and Axon UHD embedders and de-embedders to enable simultaneous UHD, 1080p and 1080i input and output paths. Sony BVM X300 32" 4K HDR monitors featured in the main production and vision areas, with 3G monitoring in all other areas. The TSV2 unit supported the Big Top (Stage 2) coverage. The MVT5 unit was used for the live replay and archive operation and this is where SAM's LiveTouch replay and highlights system really came to the fore, sitting at the heart of the operation. UHD feeds were delivered from Sony HDC4300 cameras featuring Canon UHD lenses to MTV5. Three LiveTouch servers were used – two to record the live feeds from the two main music stages, and one to handle live replays, interviews, voxboxes and daily highlights. The three LiveTouch servers provided 120 hours of UHD storage each day with the system's 'Always in Record' technology. At the end of each day, playlists and clips were archived via Fileflow directly to Editshare storage. Greig explains that on each of the four festival days, the Presentation program mix, Main Stage mix and the Big Top mix were covered by multiple cameras. Directorial program cuts for each mix was carried out – in UHD – using the remote panels of a 6M/E SAM Kahuna production switcher. The main panel of the switcher simultaneously produced the combined live program output sent to the broadcaster.

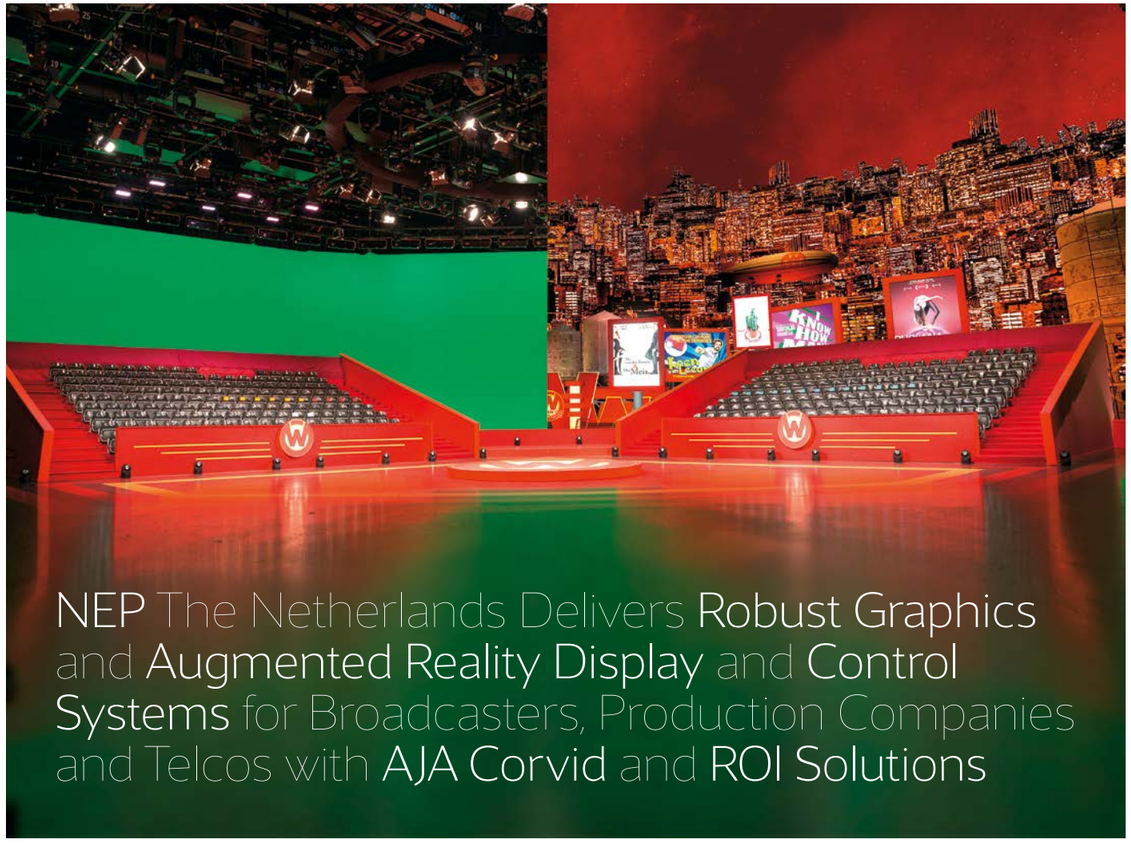
The Workflow

Content from the stages was recorded on three LiveTouch servers and used by three independent replay operators to compile the excerpts of the early acts for playout during the evening's live broadcast. The operators were responsible for clipping acts and creating highlight playlists for end-of-day programming. All UHD content was streamed between the three LiveTouch systems in a 2in/2out set-up. Graphics, bumpers and stings were created in Adobe Premiere and imported via SAM's Fileflow transcode and delivery workflow engine using XAVCi Class 300 codec wrapped in an MXF container throughout the day. Each LiveTouch replay workstation also offered a complete craft editor (based on Rio) with a powerful creative toolset unique to LiveTouch, this for Greig was one of the pivotal aspects of the LiveTouch workflow. LiveTouch is seamlessly integrated with its own Rio editor so any shots or audio can be instantaneously corrected within the playout server, avoiding the time consuming back and forth with the onsite Adobe craft edit station," he adds. Also forming part of the workflow was a separate archive system that recorded the stage cuts and isolated cameras. This was made available to the onsite edit personnel for backup and proxy production via a 10GbE network.

On the audio side, both a 5.1 mix and a downmix (LoRo) generated from each stage were sent to OB2's Calrec Apollo mixer for QC and routing. MADI from the Calrec, alongside the audio track from the music stages, was fed into a SAM Sirius 840 router. Embedding output cards were then used to record the eight tracks of audio in the first quadrant of the UHD Quad signal (i.e., 5.1 plus downmix). Greig explains that "having one frame from the downmix made things easier." The 5.1 output from the Calrec was Dolby E encoded and inserted into AES2 of the Axon UHD embedded (1st Quadrant) signal. The downmix from the music stages was embedded on AES1. The same audio allocation was embedded into the 1080i/50 HD feed which was directly uplinked to satellite from the site.

An enjoyable and immersive UHD experience

After four days of live music, interviews, voxboxes and highlights packages, the workflow had to cope with around 180 hours of recorded content, using XAVC Class 300. With the rigs dismantled and the trucks making their way back to base or their next assignment, Greig commented: "The ability to record, transmit and edit three productions in UHD and 5.1 simultaneously is a big task but the workflow stood up to the pressures, delivering an enjoyable and immersive UHD experience." Commenting on the use of SAM's LiveTouch as part of the new UHD production set-up, he added, "It exceeded all expectations and was the perfect tool for the workflow this operation required."



From the Oscars to the Olympics NEP provides the expertise, people and next generation broadcast IT facilities to help its clients develop and deliver the world's biggest and best live broadcast events.

Every day content creators, production companies, broadcasters and telcos rely on NEP's managed services for OB, studio and cloud production; host broadcasting; and playout to reach their global audiences. With integral post-production, visual effects (VFX) and Augmented Reality (AR) services coupled with low latency live streaming, CDN, VoD, digital media services, playout, media asset management and uplink communications, NEP provides a unique breadth of managed services. NEP The Netherlands, part of NEP's Global Network, is one of the few broadcast and media services providers to own and operate its own broadcast IT facilities and cloud native IT media infrastructure. With various media hubs and 20 offices spread throughout the globe, NEP is uniquely positioned to serve clients around the world.

The Graphics department of NEP The Netherlands (NEP) embraces the company's hands-on approach to client productions, and is deeply involved in every aspect of a project from the ground-up – providing development, operator, design and support throughout as a managed service. In the beginning stages of the creative process, the Graphics team discusses project specifications and demands with the clients at length, and then builds tailored systems comprising software and hardware to meet those unique needs; AJA Corvid I/O cards are often a key component of each build.

"We get a feel for what our client wants to do, and then determine the best combination of software and hardware to execute their vision, which often involves writing a lot of custom software," shared Marlon Etheredge MSc, team lead, graphics development, NEP. "The number and type of inputs and outputs are important considerations in our process, which is why we've integrated AJA Corvid boards into a number of our systems. There are so many options with Corvid, so if the client needs four inputs or four outputs, we'll go with the Corvid 44, and if they need eight inputs or eight outputs or any combination up to eight channels, then we'll opt for a Corvid 88."

On-Site Full Range of Managed Broadcast Services and Media Solutions

To service clients, NEP has built a large media hub at the Media Park in the heart of the Netherlands, which includes downlink facilities (teleport), production offices, edit suites, cloud production galleries, LiveCenter, (MCR), playout facilities and ten studios that house IP cameras and a range of LED displays.

Near the facility's main headquarters, NEP hosts a data center with systems that power studios across the Media Park, including dozens of graphics and display solutions featuring AJA Corvid 88 8-channel I/O cards, Corvid 44 4-channel I/O cards or Corvid 22 2-channel I/O cards; the type of card varies based on the number of inputs and outputs required for each client's production. The main part of on-air graphics for productions is designed, built and managed through this data center via NEP's cloud production platform and 10,000M of privately owned Fiber, then output to displays in each studio. NEP separately offers a fleet of OB trucks for remote production that also leverage AJA gear for live production.

"We've been using Corvid cards in our systems for quite some time now, especially for clients with sports productions," Etheredge said. "And we're continually adding new ones as we expand the number of systems we have here at our Media Hub. One of the greatest Corvid features is that all the inputs and outputs on the board are configurable, so there's no fixed number of inputs and outputs; the SDK is also quite advanced."

Each graphics and display system typically includes custom NEP software, an HP workstation and an NVIDIA graphics card. With Corvid cards built into these solutions, NEP is equipped with SDI I/O for inputting SDI channels, which makes it easy to render and output the incoming signal. The cards are also deeply integrated with NEP's proprietary SQUARE broadcast and live event title and display management software, which powers different screen setups within each studio. Etheredge explained, "Without an I/O board like Corvid, we couldn't do what we do. It provides a simple cost-effective I/O solution that delivers excellent results." Depending on the client's infrastructure, NEP may also opt to deploy AJA ROI scan converters in its systems for DVI to SDI conversion. Using ROI-DVI as a splitter, the system enables one DVI input, an SDI output and a DVI output.

The ROI converters recently helped NEP complete a client project that required outputting graphics to a display in-studio while also outputting the feed to a video mixer. Using ROI-DVI, they were able to split the signal for SDI for video and a DVI output going to the screen. The same setup has also been deployed in-studio by clients with large touchscreens. ROI-DVI provides the flexibility to display rendered graphics onto a touchscreen, while also providing a way to output full screen images with the rendered images to the video mixer. The rendered image is sent through the touchscreen, with the region selected.

"ROI-DVI is stable and delivers incredible quality, which is what our clients need. It blends seamlessly into an array of setups," Etheredge expressed.

Servicing (Local) Broadcasters

The Media Park is always abuzz with multiple clients leveraging studio space to produce and deliver on-screen, post and AR graphics for news, entertainment and sports broadcasts. Liberty Global, the parent company of Ziggo Sport, selected NEP to build, operate and maintain the complete playout and technical production for the open Ziggo Sport channel, available exclusively for Ziggo subscribers, and a pay-TV service called Ziggo Sport Total, which consists of six channels and is passed through the TV distributors in the Netherlands. There are also five OTT Internet channels/streams for broadcasting the Formula 1 Grand Prix. Working closely with Ziggo Sport, Etheredge and the NEP graphics team developed a range of solutions that are used for these broadcasts; this includes systems for rendering graphic overlays, displaying video across multiple in-studio screens and delivering augmented reality graphics and virtual sets. The setup also features a number of Corvid cards including the Corvid 88.

NEP also provides managed services to the Dutch Public Broadcaster, including Graphics. Its setup includes nine custom NEP systems that power live graphics production for nine in-studio screens consisting of dozens of display outputs from large projection screens to LED screens and banners. At the center of each system is an AJA Corvid 22 I/O board and SQUARE, which enables quick and easy graphics control and display to those outputs to enrich the imagery in-studio.

Developing and Deploying Augmented Reality (AR) Graphics

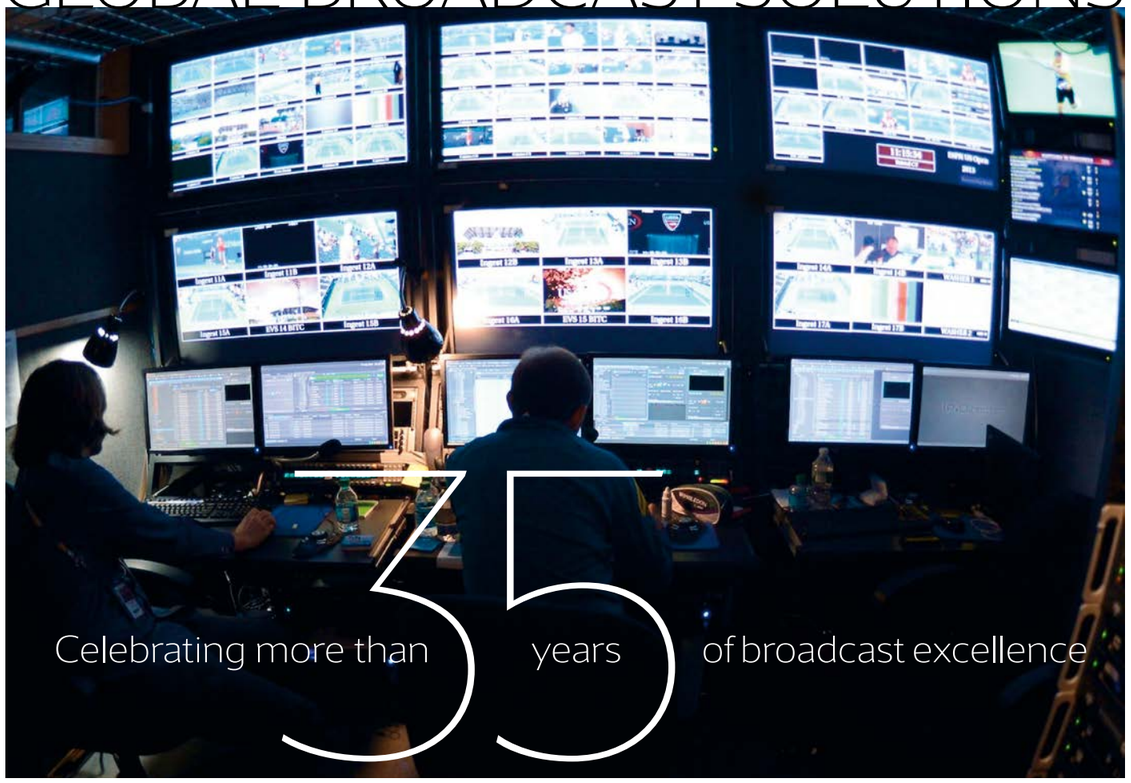
Recently, NEP has seen a rise in demand from clients, like Ziggo Sport (Liberty Global), looking to integrate AR graphics into their programming to enrich the viewing experience with an added wow factor. As a result, NEP has equipped its studios with all the tools to facilitate everything from virtual sets to set extensions, props, statistics, analytics and set exchange.

The setups typically include a green screen, cameras and camera tracking. Accompanying systems in the data center run NEP's proprietary augmented reality platform CUBE, and include an HP workstation, NVIDIA card and an AJA Corvid I/O board, which allow for the output of camera feeds, graphics render, and final composite and distribution of the output. All of the technology, including a specialized camera tracking system and a next generation rendering engine, is integrated into CUBE– making it easy for clients to deliver higher-quality photo-real graphics.

In addition to providing the end-to-end production workflow for AR graphics implementation, NEP also offers up a specialized team of designers, developers and operators that help clients achieve high end results while maximizing impact from their budgets and enabling fast studio set turnaround.

From Augmented Reality graphics to traditional broadcasting, NEP combines creative ingenuity with IT expertise and cutting edge technology to deliver services that transform the way global video entertainment is created, managed and distributed.

GLOBAL BROADCAST SOLUTIONS



Bexel skillfully delivers unparalleled production services and engineering expertise for some of the world's largest televised events. Bexel has mastered the art of service from concept to completion, and its unique solutions enable broadcasters to capture powerful content anywhere in the world.

Bexel's specialized broadcast offerings include fibre, specialty cameras, 4K solutions, graphics, custom flypacks, RF audio and intercom, as well as systems integration, managed services, enterprise solutions, and product sales. Since 1981, Bexel has continually enhanced and evolved the media production experience.

The company has earned its reputation as an innovative broadcast services provider with international aptitude, where dependability and expertise come standard. Whether local or on location Bexel's operational excellence is evident in the company's ability to adapt in technically challenging and high-profile environments.

Equipment Hire and Production Services

Bexel continually invests in leading broadcast equipment and technologies to meet the needs of the global broadcast market. From the latest 4K and HD broadcast camera systems to specialty cameras including, robotic, high frame rate and custom application cameras., Bexel offers the full range of equipment to complement any production — including lenses, recorders, servers, LED lighting, fibre optic solutions, graphics and virtual production solutions, custom flyaway systems, RF audio and intercom systems, 4K monitors, and terminal gear. All equipment is maintained to the highest standards by a rigorous QC process, conducted by in-house certified engineers for inbound and outbound equipment.

Bexel has mastered the art of service, with a distinctive approach that demonstrates that no two projects are the same. On any large-scale project, Bexel creates a true partnership with the client by evaluating the site perimeters, technical environment, and production expectations to ensure a unique solution scaled to the project's specific needs. . The company has a keen ability to anticipate and manage risks of technical failure due to environmental conditions, shipping logistics, and tight deadlines. The combined experience, knowledge and technical know-how of Bexel's team make up the company's competitive edge. With an expansive, global footprint, Bexel is positioned to provide technical support 24 hours a day, seven days a week. Bexel's ability to design, build, and support technically advanced, scalable production environments with an exceptional engineering team offers a recipe for broadcast excellence.

Bexel now Part of the NEP Group

On August 1st NEP the global industry-leading provider of outsourced broadcast and live event production solutions, announced that they have acquired Bexel Global Broadcast Solutions, a subsidiary of Vitec Group plc. Headquartered in Pittsburgh with offices in 21 countries, NEP's addition of Bexel strengthens its position as the worldwide broadcast services leader, and expands their ability to provide a comprehensive, one-stop set of solutions to broadcast clients in virtually every region and territory around the globe.

"NEP and Bexel share similar cultures and have delivered decades of exceptional service to our clients. Our companies have enjoyed a strong working relationship for years," said Kevin Rabbitt, NEP CEO. "Bexel has built a great reputation in the industry, and I'm excited to have them as part of our Worldwide Network. The addition of their scalable flypack systems, as well as other critical integration services, will position us for accelerated growth into 2018 and beyond."

Headquartered in Burbank with operations in California and Texas, Bexel has provided innovative outsourced broadcast solutions and rental equipment to the premium sports, entertainment and live event production markets for more than 35 years. Bexel's U.S.-based scalable flypack systems brings NEP's inventory to 34 flypack solutions for any sized event, anywhere around the world.

Following the acquisition, Bexel will continue to sell specific services under its own brand, and operate out of existing facilities providing flypacks, high frame rate specialty cameras, HD camera chains, lenses, EVS machines and more.

"Joining forces with the industry leader is excellent news for us and our clients," said Halid Hatic, President and General Manager of Bexel. "Our clients will have access to even more resources and talent, and our employees can take their careers to the next level as part of the NEP Worldwide Network. It's really a fantastic fit and opportunity for both companies."

Project: Preparing for South Korea

At the upcoming event in Pyeongchang, South Korea, Bexel will once again be tasked to provide unparalleled broadcast support for a large-scale, multi-venue, globally visible event. Among a number of unique location and logistical challenges, the Bexel team will supply a range of production equipment including flypacks, cameras, fibre, audio processing and monitoring, video conversion, video monitors, recorders, and terminal gear to help a large number of international broadcasters cover the multitude of sporting events. Bexel will have more than 20 skilled engineers and project managers on the ground to support fully equipped, multi-camera flyaway systems that consist of Sony camera systems, Evertz routing, and Sony and Grass Valley switchers. Bexel will supply close to 40 Panasonic P2 ENG camera packages, complementary camera supports and lenses, RF intercom, and terminal accessories.Bexel's support in Pyeongchang will again spotlight the breadth and expertise of Bexel's broadcast capabilities, ensuring the success of a high profile, multi-venue event for a worldwide telecast.

Bexel ESS: Systems Integration and Managed Services

Bexel ESS, a division of Bexel, is the choice vendor for custom systems integration, managed services, and fibre-optic solutions for high-profile broadcasters and networks. Launched in 2012, Bexel ESS designs and installs complete, turnkey solutions for permanent facilities, major events, live game production, and enterprise markets. Bexel ESS pioneered the conversion of copper cable plant systems to optical fibre, and today the company specializes in design, implementation, and maintenance of broadcast cable plants. The ESS team offers clients a unique view on the selection, implementation,

and integration of broadcast and media technology. The company's custom solutions are fine-tuned to deliver outstanding product performance and broadcast workflows. From small multi-camera systems and flyways to completely integrated control rooms and studios, Bexel ESS is a long-term partner in engineered broadcast systems.

Whether the location is a stadium, arena, entertainment venue, campus, or a remote environment, Bexel ESS has the experience, equipment and renowned technical expertise to deploy complex broadcast solutions. Bexel ESS has a unique industry perspective and understands the future of broadcast-specific technology and its impact on the market. As a result, the ESS team can advise its clients about emerging technology applications and how to properly plan for them while designing a facility or preparing for an event, thereby maximizing every client's investment.

Broadcast-Quality Solutions for Enterprise Video

In growing numbers, enterprises are recognizing the important role that video can play in their operations for everything from training employees to communicating with customers and shareholders. Until recently, however, enterprise video projects have been slow to catch on as organizations struggled to overcome cost and technology barriers. With the built-in video capabilities of smartphones and other personal devices getting more sophisticated by the minute, we're clearly living in a video age. Bexel ESS has been working on delivering a comprehensive video solution that meets all of its enterprise customers' requirements. The basic concept is a mobile broadcast facility for everyday enterprise video production that allows enterprises to deliver the same, consistent video quality as a television newscast, but without the complex operation, capital equipment investment, fixed-site equipment, and trained video staff of an in-house studio. This approach places a strong emphasis on simplicity – it should be as simple as possible to light and mic subjects and then record and stream content, without the need for a fixed location taking up precious space.

The result of this development effort is the Creative Studio, a type of "pop-up studio" that can be made available as a rental package or for purchase at a much lower cost than purchasing discrete equipment. Designed for use in a conference room setting, the Creative Studio provides fully integrated HD or 4K video capture and streaming with a PTZ camera. In addition, the solution offers incremental functionality including prompting, recording and monitoring, storage for post-production, or streaming to any number of internal or external distribution sites including Facebook, YouTube, and other social media sites. Since the Creative Studio does not require a dedicated video staff, it can be set up and operated by anyone in the enterprise; for instance, templated production tools help non-technical users position lights and backdrops to achieve a professional look. And because this solution is compact and mobile, enterprises can deploy it anywhere in a building, on a campus, or around the world.

Bexel TSS: Product Sales

Bexel TSS, a division of Bexel, has offered the latest new and pre-owned broadcast video and professional audio equipment since 1991. The company's success is due in part to its commitment to sell more than just a product in a box. Bexel TSS partners with customers to provide complete systems and solutions that support a variety of production needs.

New Equipment

Over the years, Bexel TSS has expanded its inventory to include over 100 dealerships with top-of-the-line professional audio and broadcast video manufacturers, as well as a proprietary line of intercom and audio products made in house under the ASG brand. From complete camera chains to lighting systems, audio mixers and converters, customers have access to a wide range of industry standard product lines, including Anton Bauer, Litepanels, SmallHD, Wohler, Teradek, Sennheiser, Shure, Sachtler, Panasonic, Clear-Com, AJA, Black Magic Design, Evertz, Lectrosonics, TSL and more. Backed by Bexel's world-class engineering and a proven track record of reliability, Bexel TSS ensures unequaled service and product solutions at exceptional prices.

Liquidation Services

Bexel TSS also offers Liquidation Services to assist its customers and coordinate auctions to maximize return on their marketable equipment. The company organizes consignment auctions on a quarterly basis from its Burbank, Calif. headquarters. Contact Bexel TSS to submit an equipment inventory list for consideration in the next auction.

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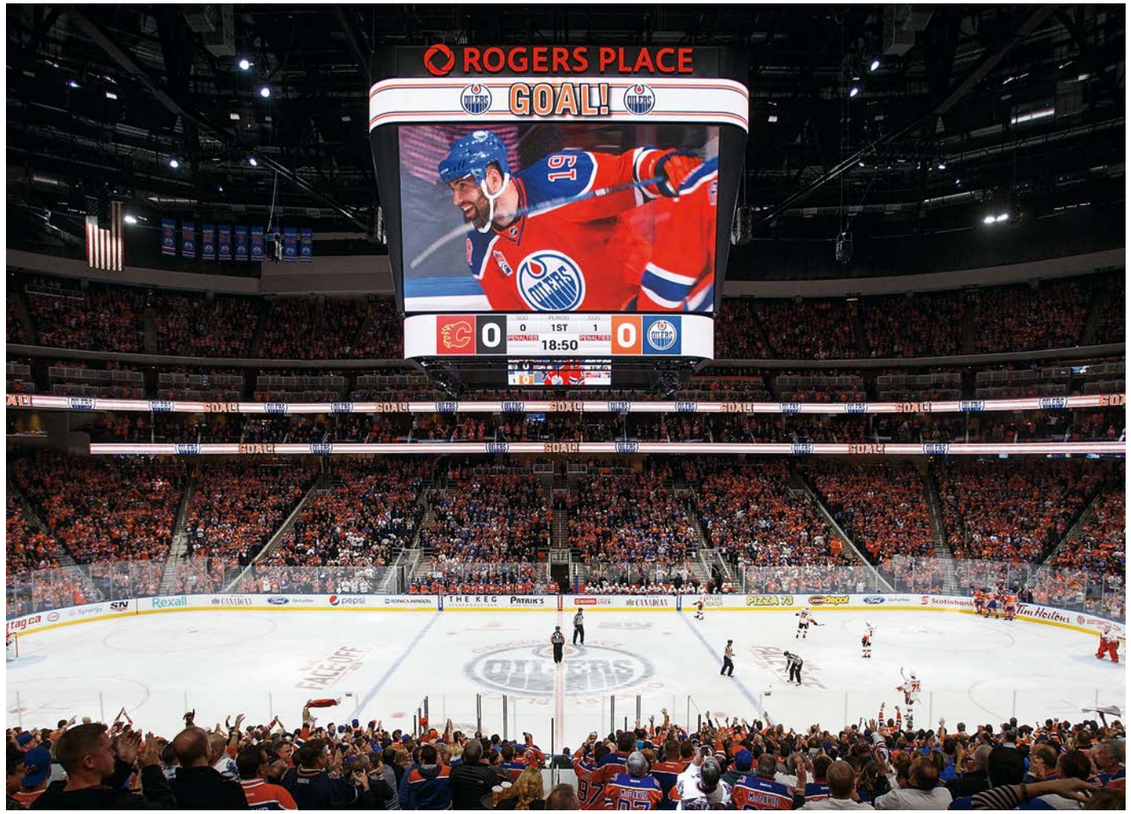


The NHL's Edmonton Oilers Rely on Fujinon Lenses for Inaugural Season in Rogers Place Arena

ROGERS PLACE

After more than 40 years of play at its previous arena, the NHL's Edmonton Oilers team found their new home in the Rogers Place for the 2016-17 season.

The 18,500-seat Alberta arena is the centerpiece of an impressive, large-scale redevelopment plan in downtown Edmonton. The build included an investment in six FUJINON lenses, and Rogers Place now houses the following lenses from the Optical Devices Division of FUJIFILM: a HA14x4.5BERM super wide angle and two XA77x9.5BESM telephoto lenses, along with a HA18x5.5BERD and two HA18x7.6BERM HA Premier Series ENG lenses. The lenses are relied on for game day action, including use in a camera system installed to the underside of the arena's massive videoboard.

Measuring 46 ft. wide, 36 ft. high, and 46 ft. deep, the Rogers Place videoboard is the largest of its kind in the NHL. Working with local systems integrator Matrix Video Communications, a one-of-a-kind suspended camera system was built that includes a Sony HDC-P1 box camera mounted on a dolly track hung from the bottom of the score clock.

The camera uses a FUJINON HA18X5.5BERD ENG/EFP HA Premier Series lens, traveling 15 meters along the length of the score clock to produce dynamic, bird's-eye-view shots of the game. This angle is used for in-arena video presentation and for national broadcasts on Sportsnet.

The Edmonton Oilers' videoboard show uses three handheld cameras: two wired Sony HSC-100RF cameras equipped with FUJINON HA18x7.6BERM ENG lenses and a Sony PXW-X500 EFP camera with a FUJINON HA14X4.5BERM super wide angle lens configured with an RF transmitter for wireless operation. These handheld cameras shoot hockey action, fans and interviews.

"The FUJINON lenses have proven to be very robust and delivered superior image quality during the inaugural season of NHL hockey in Edmonton at Rogers Place," said Keith Hough, Manager, Production Services, Rogers Place, Oilers Entertainment Group. "In outside broadcast production, the equipment must be very durable as it's moved, setup, disassembled, and moved again multiple times throughout the season. The lenses withstood this harsh treatment and still produced beautiful pictures at every event."

FUJINON lenses were also relied on for two standard 'hard camera' positions in the arena, in which Sony HSC-100RF cameras are equipped with FUJINON XA77x9.5BESM telephoto field lenses with FUJINON MS-21D digital semi-servo controller kits.

"The XA77x9.5BESM lenses feature Image Stabilization, which is very useful at the telephoto end of the zoom," Hough explained. "The building can really shake with 18,500 screaming fans!"

Hough added, "Our FUJINON lenses have performed exceptionally well at Rogers Place and are a key contributor to the world-class events taking place in this arena every week."

The Edmonton Oilers are a professional ice hockey based in Edmonton, Alberta. They are members of the Pacific Division of the Western Conference of the National Hockey League (NHL).

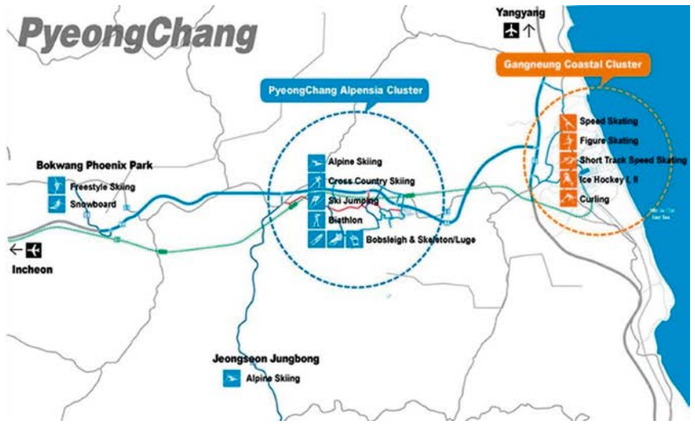
The Oilers were founded on November 1, 1971, with the team playing its first season in 1972, as one of the twelve founding franchises of the major professional World Hockey Association (WHA).

They were originally intended to be one of two WHA teams in Alberta (the other one being the Calgary Broncos). However, when the Broncos relocated to Cleveland, Ohio, before the WHA's first season began, the Oilers were renamed the Alberta Oilers. They returned to using the Edmonton Oilers name for the following year, and have been called that ever since. The Oilers subsequently joined the NHL in 1979 as one of four franchises introduced through the NHL merger with the WHA.

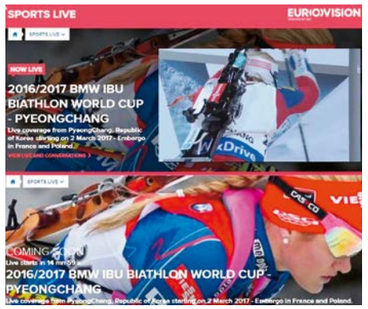
After joining the NHL, the Oilers went on to win the Stanley Cup on five occasions in the 1980's. Along with the Pittsburgh Penguins, the Oilers are tied for the most championships won by any team since the NHL-WHA merger and also the most won by any team that joined the league in or after 1967. Among all NHL teams, only the Montreal Canadiens have won the Stanley Cup more times since the League's 1967 expansion. For their success in the 1980s, the Oilers team of this era has been honoured with dynasty status by the Hockey Hall of Fame.

FUJIFILM ROGERS PLACE OILERS

AMP VISUAL TV IN PYEONGCHANG



FLY AWAY PACK RF12 FOR BIATHLON



Ahead of the Winter Olympics due to take place in Pyeongchang in 2018, a leg of the Biathlon World Cup was organised in South Korea in March this year. On behalf of Eurovision, AMP VISUAL TV Shipped and set up a Fly away pack offering exceptional features thanks to the technological specifications adopted when constructing the Millennium Signature 12 OB truck. Let's take a closer look.

The Millennium Signature 12, undoubtedly one of the most powerful OB trucks currently in service in Europe, was first used in France in June 2016 for the 24 Hours of Le Mans race. This new generation truck offers a maximum capacity of 45 cameras, thanks in particular to its brand-new Riedel MicroN router core. This device offers modularity and the ability to assign part of its resources to other installations, while the OB truck can still shoot with up to 25 cameras in 4K UHD. A new tool, the Fly away pack 12 (RF12), will therefore cover major international and overseas events.

This was precisely the case with the filming undertaken by AMP VISUAL TV on behalf of the EUROVISION in Pyeongchang at a world biathlon event for which the RF12 was deployed. Franck Reynaud, Technical Director of Production, explains: "We had to provide the entire technical side of the TV production for the events, supplying four feeds: the international dirty feed along the race and three additional feeds (shooting range production, and two feeds for the graphics services); but also, all video and audio distribution for local Right holders. In addition of what, AMP VISUAL TV has also to manage technically speaking the different commentary positions requested and embedded multi-lingual audio tracks in the main uplink feed. "In total, 26 cameras, including 13 hard cameras equipped with long range box lenses and two robotic cameras served two video mixers and have been managed by four shading positions. 18 cameras were located along the three-kilometres race course, with the rest located on the shooting range. An RF camera completed the set-up. All sources were also routed to XT3 Channel Max slow-motion servers sourced locally from a Korean rental company.

Since the flight away pack option was chosen, AMP VISUAL TV shipped from France and set up a complete production unit in a complex of twelve modular cabins.

The technological system was based on two different modular fly away packs attached to the Millennium Signature 12's Riedel MicroN processed core router. "One of the advantages of this device is to offer almost unlimited capacity in terms of processing, embedding and de-embedding capability. On top of that, it gives us the benefit of fibre connectivity functionalities, enabling us to route and share all audio sources from the field of play, in particular, the massive amount of microphones dedicated to the shooting range coverage, to all the core router, the EVS servers and the two audio mixing consoles, just with a few couple of dark fibres". Considering that the race course covers a loop of up to 3.3 km and that the shooting range was located more than 300 m from the TV Compound, it is easy to understand how this greatly facilitated cabling issues and saved a great deal of time," reveals Franck Reynaud.

Indeed, for these kinds of international shoots, it is essential to take account of both the weight of the equipment to be transported and the installation time required. The latter took no more than three days (for a 12-day event). The functionalities of the RF 12 core router additionally provide great flexibility of use, enabling continuous reassignment of all sources according with the needs of the production team and rights holder broadcasters on site.
The new RF12 is entirely modular and flexible, making it suitable for covering all major international events anywhere in the world.

RF12

Video HD

Sony XVS 8000 Up 3 M/E 8 Keyers + MP2 Frame memory
4 DVE 3D – 32 resize RGB color-correction Panel 28 direct access panel 3ME + AUX
Sony HDC 4300
Up to 22 HD or 10 UHD
EVS 8 channel video server
Up to 6 HD or 3 UHD
Up to 6 HD DECK + USB recorder
Riedel MediorNet System
144 x 144

Monitors wall

Riedel MediorNet system
SONY BVM grade
1 OLED monitors
Tektronix WFM 8200 control

Sound

Calrec Artemis 16 mic/line
12 line output
1 Madi 64 I/O Desk 24 faders
1 Stage box Apollo & Artemis
24 mic/line input –
8 line output

Intercom

Riedel Artist 64 x 64 Matrix

SPORT HQ ON AIR

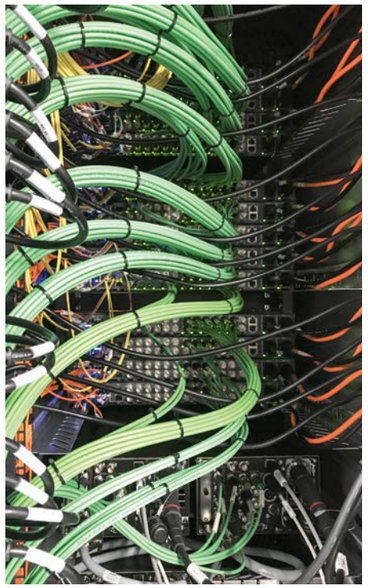
"Sky Sport HQ" in numbers: 90 new jobs, a total area of 4,600 square metres, four studios over 1,700 square metres, 50 kilometres of cable, 1,000 terabytes of memory space, up to 76 simultaneous live signals and an 84 square metre LED wall.

The company's own production facility marks the next large milestone in Sky Deutschland's company history. Whether live sport on pay-TV, Sky Sport News HD on free-TV, the new sports portal skysport.de or the constantly growing presence on social media: with its own broadcasting centre, in the future Sky will be able to offer the whole world of sports from a single source.

After a construction period of ten months, an intensive test and training phase and a total investment cost in the double-digit million range, the state-of-the-art Sky broadcasting centre was put into operation on July 1, 2017, and will be the home of all of Sky Sport's studio productions in the future. The new production facility is a clear commitment to the media location Unterföhring and Bavaria, with Sky Deutschland continuing to make a significant contribution to its development. According to Sky, the move is set to create 90 new jobs in studio production and broadcasting.

IP backbone based on Riedel MediorNet

The classic video router is a thing of the past – at least in the Unterföhring-based pay-TV station's state-of-the-art broadcasting centre. With this major project, Sky sets a further milestone and relies on a complete MediorNet infrastructure that unites decentralised routing, signal transport and processing along with an integrated multiviewer. It is the largest MediorNet backbone so far and at the same time the heart of Sky Sport HQ, which was designed as one of the most modern and largest broadcast IT infrastructures for live sport productions in Europe. Overall responsibility for the new technical construction lay with system architect and Riedel-partner Qvest Media. For Sky, the company designed the workflow, took on responsibility for the turnkey realisation of the whole system infrastructure and integrated Riedel's MediorNet as IP backbone.



The largest MediorNet installation with virtual multiviewer worldwide

"With Sky Sport HQ we have realised our vision of sport production of the future: high-quality, state-of-the-art, smart and innovative. With the scalable MediorNet system design, we are perfectly equipped for IP-based workflows and 4K productions, while achieving maximum integration in a new dimension of flexibility," says Alessandro Reitano, Vice President, Sports Production at Sky Deutschland. "With MediorNet, we enjoy the advantage of a real-time network's enormous routing capacities, which makes classic video routers redundant. Plus, we are pleased about MediorNet's further key advantages: a virtual multiviewer, signal transport and signal processing – all in one system."

Alessandro Reitano
Vice President, Sports Production at Sky Deutschland

sky

The studios at the heart of Sky's sport coverage have a long and fruitful TV history

This is the location where the RIVA television studios, which were used by Bayerischer Rundfunk (Bavarian Broadcasting) and ZDF, commenced operations in the early 1960s. Additionally to appearances by stars such as the Rolling Stones, ABBA, Udo Jürgens, Roy Black, Siegfried and Roy or Bud Spencer, German TV legends including Thomas Gottschalk, Hans Rosenthal, Ilja Richter or Günter Jauch were born here.

In the future, all of Sky Sport's studio programmes and match conferences will be produced here. "Sky Sport HQ" went live in early July with the broadcast of Wimbledon. Further programmes, which will be produced here in the future, include the extensive coverage of the German Bundesliga on Saturdays and Sundays, the live broadcasts of the UEFA Champions League on Tuesday and Wednesday evenings, the programme "Alle Spiele, alle Tore" ("All Games, All Goals") as well as the talk formats "Wontorra – der Fußball-Talk" ("Wontorra – the football talk") and "Sky90 – the Kia Fußballdebatte" ("Sky90 – the Kia football debate"). Coverage of the 2nd Bundesliga, the DFB Cup and the UEFA Europa League is produced and broadcast from the second the second studio at new production site, while Golf, Tennis and Formula 1 as well as further digital channels and Sky Sport News HD have also found their new home here.

Technical details for Sky Sport HQ

The new broadcast centre is spread over a total area of 4,600 square meters of which 1,700 square metres are occupied by four studios. 50 kilometres of cable were laid, 1,000 terabyte of storage capacity are available and up to 76 live signals can be processed here simultaneously.
A special eye-catcher in the new facilities is the LED wall located in the main studio: the custom-made wall with a length of 35 metres and a height of 2.4 metres features millions of LEDS on its 84 square metres, which displays analysis, diagrams and scenes from the game. An LED floor is fittingly embedded in the middle of the studio.

Supporting the four studios with 10x HDC-4300/HDC-P43 cameras from Sony are:

3 Video Galleries (1x Main, 2x Hybrid with VIZ Opus)
3 Audio Galleries with Lawo desks
8 PCRs (HD) and 1 PCR(UHD)
20 Voiceover Cabins (Single- and double Occupancy)
4 Adobe Edit Suits
Imagine ADC Automation System
VIZ One MAM
Avid iNews Editorial System
ScheduALL Resource Management
Mosart Automation Clients

Dante Audio Network (Routing via Lawo VSM)
EVS XS/XT3 for Ingest, Playout and Production Tasks (Total of 76 Ports)
14 redundant TX Chains (including Dolby)
870 TB Storage (Isilon)
Full IP Backend based on Riedel MediorNet with 1,072 Coupling-Points
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Central Equipment Room with 64 Racks
In-House Format: AVCi 100 (16 Audio Tracks) / Legacy Archive Format: XDCAM 50

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Televising the Revolution:

How ES Broadcast Hire is supporting 4K live production

4K broadcast hire specialist ES Broadcast Hire explains how it is making significant investment in the technology supporting the build in momentum behind UHD broadcasting.

The move to 4K is the biggest challenge faced by the live production industry since the advent of HD over a decade ago. And even though the majority of viewing is still in HD or even SD, demand for UHD – driven in part by a consumer market already hooked on 4K, HDR content from IP-based VOD providers such as Amazon and Netflix – is only increasing. This brings an unavoidable necessity for outside broadcast companies to be able to call upon the latest UHD technology – from cameras and lenses to production servers and monitors. In striving to support 4K live production by stocking a large and diverse 4K hire fleet, ES Broadcast Hire is helping to pioneer the UHD upgrade – and positioning itself as one of the UK and Europe's leading 4K hire companies.

As with the transition to HD, live sport is proving to be a fertile testing ground for the step up to UHD, something that ES Broadcast Hire's Managing Director Warren Taggart is very mindful of as he shapes the company's technology investment strategy. With OB clients requiring lengthy lists of high-end equipment, Taggart has prioritised building one of the largest 4K hire fleets in Europe. Making an early commitment to UHD technology was a bold move that was laden with risk but which has seen ES Broadcast Hire firmly established as one of the leading providers of this new category of equipment.

Investing in the right 4K equipment to support OB clients

Investing in the right equipment has always been a matter of building excellent customer relationships and listening to clients' needs, explains Taggart. "Our OB clients are the ones at the coal face of live production – so we are able to work with them to identify technology trends, and to find out what demand there is from broadcasters for 4K.
"ES Broadcast also enjoys a really strong relationship with a wide range of the industry's leading manufacturers, including Sony, Grass Valley, Canon, Fujinon and EVS. This enables us to keep our finger on

the pulse of what technology is being developed, and to discuss potential new solutions with OB clients, gauging their interest, and helping them to set up technology tests before they – or we – commit to a particular piece of equipment."

Some equipment investment is more obvious and straightforward than others, says Taggart. The proliferation of Sony cameras across the OB industry meant that acquiring HDC-4300 channels was a case of when, rather than if, ES Broadcast Hire would take the plunge. As it turned out, 'when' was very early in the process, with ES being the first UK hire company to make significant investment in 4K camera channels. The 4300 fleet has subsequently been expanded to 40 channels, one of the largest hire fleets in Europe.

"When the 4300 was announced as the world's first 2/3", native 4K resolution camera, it was apparent that it would in all likelihood become the go-to 4K camera for the industry, so it was a fairly straightforward decision once we knew the demand for UHD live production was there," explains Taggart. "Whereas things like lenses are much more down to personal choice, the specific job in question, and regional preferences."

Building a diverse 4K portfolio to service different markets

Servicing different markets across the continent calls for a diversity of choice. And so the company has not only invested in a full 4K line-up of Canon box lenses much-loved in the UK – becoming the first rental house in Europe to offer Canon CJ12, CJ20, UJ27, UJ86 and UJ90 lenses earlier this year – but is one of the only hire companies in the UK to own a fleet of Fujinon UA14, UA22 and UA80 lenses, which enjoy increased popularity with European OB companies. Not that there isn't cross-over of course: in particular, Fujinon's 4K ENG lenses have seen action with UK OB companies, who have used them alongside Canon box lenses. The Fujinon UA80 has also been used regularly for UHD live coverage of Premier League football matches. To meet the needs of the European market better, there are now two ES Broadcast Hire offices on the continent, as well as the UK offices in London and Manchester. In Munich, Charles Alexis heads up operations, while Marta del Moral has overseen the opening of an office in Madrid And a third continental office is due to open in Belgium in Autumn 2017 .

Supporting prestigious 4K sports events

Taggart's largescale investment in 4K technology is paying dividends, with ES Broadcast Hire's equipment being used for UHD broadcasts of some of the sporting world's most prestigious events in the last 12 months. Fourteen HDC-4300 channels were used at the Monaco Grand Prix, along with four Canon UJ90, five Canon CJ12, 12 Fujinon UA14 and nine Fujinon UA22 lenses. The company's newest 4K cameras, the Sony HDC-P43, also made their debut at the same race, before being used at Cardiff's Principality Stadium for the UEFA Champions League final the following week to capture aerial shots – for which the camera is perfectly sized. The HDC-P43 utilises the same 4K CCU as its cousin the HDC-4300, and works with the same BPU-4000 base band processing unit, which enables 2x 4K slow motion (or 8x in HD). But as a purpose-designed POV camera, it lends itself particularly to remote camera positions and crane or aerial shots. Taggart agrees with Sony that there is a definite market for this camera. "Paired with a wide-angle lens like the Fujinon UA14 or Canon CJ12, the P43 opens up a world of options for wide-angle stadium shots, or for filming from a helicopter. We felt it was a camera that would have a big impact for our sports and live events clients," he says.

With the prevalence of super slow motion replay from every conceivable angle in sports coverage, production servers have inevitably also needed to catch up to 4K. By acquiring two EVS XT4K's in May 2017, ES Broadcast Hire has again demonstrated its commitment to proactively supporting 4K live production. The XT4K is EVS' first dedicated 4K live production server, and offers four 4K channels with flexible in/out configuration, allowing operators to produce the latest in UHD slow motion replays. "EVS solutions lead the market – especially with the company's technological advances in production servers," explains Taggart. "The EVS name is synonymous with reliable, cutting-edge live solutions, and having them in our hire fleet will enable us to continue our commitment to providing market-leading 4K equipment to our clients."

Beyond sport – 4K for live events and studios

It's not just sport that is moving towards 4K though. ES Broadcast Hire has seen a big upturn in 4K rentals going out to live events such as music festivals, including performances at Sussex's Glyndebourne opera house. Light entertainment too is tentatively treading the path to 4K – and it is in these studio scenarios where the latest lens in Canon's artillery will really

blossom. The UJ27 UHD DIGISUPER 27 was announced at IBC 2016 and Warren Taggart moved swiftly to place an initial order for four lenses, which were delivered earlier in 2017 – the first delivery of any hire company in Europe. The lens' flexibility for studio work such as sitcoms and panel shows, added to the ubiquitous need for a lens of this range on the halfway line at football stadia, made it a sound investment, says Taggart. "Studios and OB companies have been requesting a smaller UHD box lens for some time now, so making sure we were at the front of the queue to get the UJ27 into our fleet was key to delivering the latest technology to our clients," he explains. "The UJ27 builds on the immense success of Canon's original HD DIGISUPER 27, and with the ease of use and reliability of Canon's lenses, I have no doubt it will prove to be very popular indeed – as well as making 4K achievable for a wide range of studio productions."

The missing piece of the 4K lens jigsaw is a successor to the Canon HJ40 – a workhorse lens if ever there were one. A 40x ENG lens is surely on the horizon, as both Canon and Fujinon complete the modernisation of their lens line-ups. The arrival of such a lens will further expand the scope of 4K broadcasts. "A 40x lens will give clients the full range of lenses that they've relied on in HD production for so long," Taggart says. "There's a lot of anticipation around it, and it will be perfect for sports like golf and darts."

Turning 4K from an aspiration into reality

Of course, widespread 4K broadcast is still very much an aspiration, but even for productions that are still in HD, there are the beginnings of a transition to the equipment of the future. HD productions are benefiting from using cameras like the HDC-4300, with its high-speed imaging capabilities. In sport, for example, the 4300 has superseded the HDC-3300 as the camera of choice for slow motion, offering 8x capture at HD. Undeniably, the 4K revolution is gathering critical momentum, and ES Broadcast Hire is committed to helping broadcasters and OB companies deliver more and more live productions in UHD. "Our philosophy is quite simple," says Warren Taggart. "We believe that 4K is the future of live production, and we want to be at the very forefront of making that transition a resounding success. The way we achieve that is by listening to our clients, by helping them to identify the best 4K solutions for their needs, and by continuing to pioneer investment in the latest 4K broadcast technology."

ES BROADCAST HIRE

INDEX

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