CALREC

eSports

Contents

Introduction

eSports is the fastest-growing spectator sport in the world. With passionate audiences, and a hunger for bigger and more complex tournaments, many eSports broadcasters are looking at more traditional broadcast infrastructures to increase revenue. Calrec works with some of the heaviest hitters from the eSports world, helping them to produce engaging content which sounds amazing.

While Calrec's remote capabilities helps keep costs down, its AES67-ready backbone has one eye on the future, allowing you to play nicely with other suppliers on the AIMS roadmap.

Calrec is the most trusted name in live broadcast audio, and is already a market leader in outside broadcast and remote production.

Calrec's reputation for reliability, ease of use, customer support and build quality is proving very appealing to eSports broadcasters.

Contact us to find out how we can help you to grow your audience by helping you improve your content.

Dave Letson
Calrec VP of Sales

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CALREC

Introduction to Calrec

For more than 50 years the world's most successful broadcasters have relied on Calrec.

They still do. As our industry adapts to new viewing habits and evolving commercial environments, Calrec is helping broadcasters to stay ahead as they switch to IP infrastructures; to achieve efficiency with remote broadcasting; to save money with virtualised production.

Calrec's radio-focussed and flexible Type R can adapt to a variety of requirements including headless, and Calrec has expanded its range of consoles, from the cost-effective Brio consoles, to the IP-enabled ImPulse core.

For flexible working, integrated networks and reliable audio, Calrec has it covered.

History

Over the last 50 years, Calrec has earned a reputation for innovation and holds a history of technological world firsts:

1977: Calrec supplies the world's first stereo broadcast console.

1978: Calrec launches the Soundfield microphone, the world's first single point-source microphone capable of recording sound in three-dimensions for surround-compatible playback.

1981: Calrec supplies the world's first digitally controlled assignable mixing console.

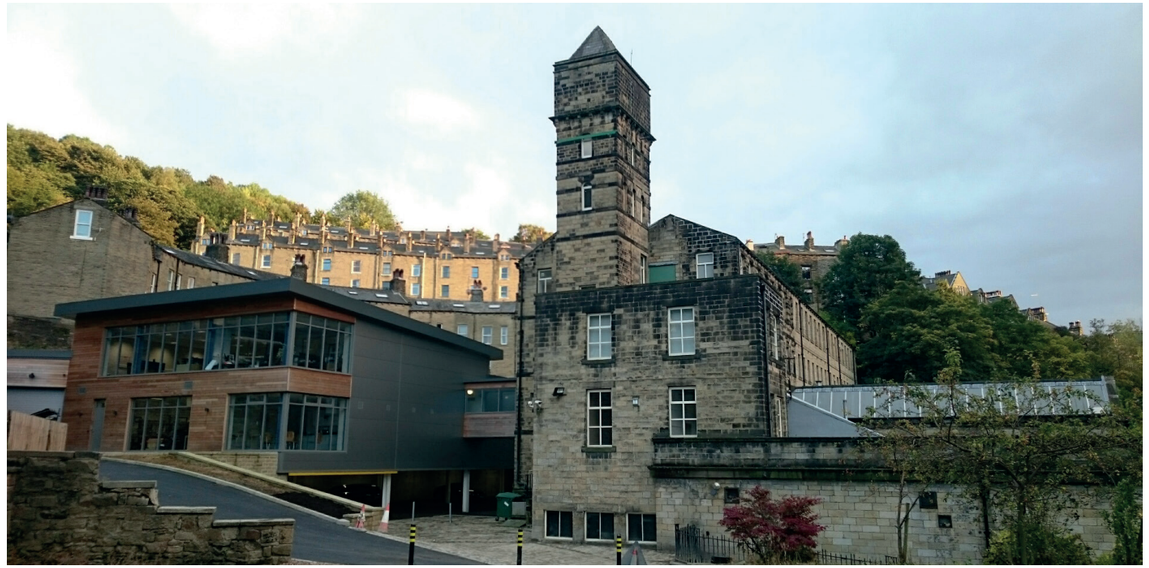
2007: Calrec launches Bluefin, an FPGA-based high-density DSP card, which permits real-time 5.1 surround mixing and processing. Bluefin is available as an upgrade to existing Calrec desks, and improves efficiency by a phenomenal 5000%. This technology is another world first for Calrec.

2009: Calrec unveils Bluefin2, a significant step up from Calrec's pioneering work with FPGAs for real-time audio DSP processing. Bluefin2 increases DSP capacity to a market-leading 1020 channel processing paths.

2009: Calrec launches Hydra2, allowing the construction of complex routing networks with control software which organises all routing.

In today's modern broadcast infrastructures we all need to be adaptable and quick to respond. We need to talk to each other across multiple languages, and we need to support all kinds of changing workflows.

It's an exciting time to be in broadcast audio, and Calrec is right in the middle of it.



Ten Reasons Calrec are experts in eSports

Why Calrec are experts in entertainment broadcasting

1. **Solid reliability in a new and burgeoning field**
   This burgeoning industry has really gained a lot of momentum in a short space of time. It has gone from online streaming to full-blown broadcasts in a few years, and now needs the technology to support it. Luckily Calrec has been in the broadcast industry for over 50 years and enjoys a reputation as class-leading broadcast engineers. Calrec already has your needs covered.

2. **Powerful and Expandable**
   Calrec's range of consoles are designed to fit any requirement. From the tiny Brio12 to the top-of-the-range Apollo console there is a desk that is right for broadcasts of any size and complexity, with the added capability of easily expanding and networking if/when the need arises.

3. **Native IP**
   Gone are the days when an audio console was required to simply mix audio. Consoles are integral components on wider networks with adaptable workflows and shareable resources using open standards and established networking technology. Calrec has a range of COTS-compatible products designed around an IP backbone, as well as a number of SMPTE 2110/AES67-compatible products to help customers transition to an IP environment which include extra control levels to allow audio labels and control data to be passed. This gives users the ability to control gain of mic inputs under a variety of network conditions. Wherever you are on your IP journey, Calrec can help you get there.

4. **Remote Production**
   Remote Production can be a very cost-effective solution for eSports broadcasting. Using a centralised studio and connecting to RP1 units at venues across the globe could save money, time and manpower. Calrec's RP1 eliminates the control, latency and transport issues previously encountered in remote workflows.

5. **Assistive Mixing Technologies**
   Calrec's consoles all have a suite of broadcast-specific features to make mixing smooth and seamless. Automixers attenuate any number of mono inputs allowing mic bleed and room noise to be easily controlled. Autofaders allow for GPIO triggers from vision switchers to quickly change audio sources in fast paced, high action productions. Combine these with fully featured EQ and Dynamics on every channel, all the time, and it becomes clear why Calrec leads the charge in broadcast audio.

6. **Audio Quality**
   While some broadcast consoles focus on functionality at the expense of sonic quality, Calrec has always prioritised both. Calrec's highly successful Bluefin technology means that sound quality on its smallest consoles is just as stunning as its bigger siblings. Mic-pre's are clear, transparent and have a fantastic transient response, and while our engineers obsess over the quality of the EQs, compressors and huge dynamic range, they are very focussed on ensuring the clearest surface layout possible. In short, with Calrec you get form, function and finesse.

7. **Reliability**
   There are no second takes with live broadcasting. Reliability is key, and Calrec has made it a priority in all its consoles. With many redundant features built-in from scratch, and thousands of consoles on-air across the globe, 24 hours a day, Calrec's reputation for reliability is second to none.

8. **Easy to use control surface**
   Calrec has been making assignable control surfaces for more than 35 years – in fact, Calrec supplied the world's first digitally controlled assignable mixing console way back in 1981. Several refinements on, Calrec consoles have a very short learning curve; they are easy to drive with lots of visual feedback, and Brio even gives you hints on how to set up your workflow.

9. **No DSP sharing**
   The difference between shared and non-shared DSP makes a huge impact on desk resources. It is better to have resources you don't need rather than having to count your inputs and outputs and worry about how much DSP you have left. Unlike other broadcast consoles, Calrec desks have separate channel and bus DSP resources at all times. Welcome to stress-free broadcasting.

10. **Audio Distribution router**
    In a fast-paced and dynamic broadcast environment, quick audio routing can be essential. That's why all Calrec consoles feature internal 1-to-n routers that allow any source to be routed to one or even all destinations, whatever you may require. Calrec routers also support external control via SW-P-08, so you can integrate your mixer into your workflow, seamlessly.

Riot Games
calrec.com

Riot Games

Growing audience using IP production and distribution workflows

eSports viewership worldwide is on a steep upward trajectory and will soon begin to challenge traditional sports broadcast audience figures. As the eSports and traditional sports communities converge, what can traditional broadcasters learn from the remote production workflows being pioneered by one of eSports' major game developers?

The first video game competition took place in 1972 at Stanford University in California between the school's best Spacewar players for the grand prize of a subscription to Rolling Stone magazine. In 1980, Atari's Space Invaders Championship attracted 10,000 participants to the first U.S. national video game tournament.

Fast forward four decades and technology consulting firm Activate is projecting that eSports—electronic sports, the name by which multiplayer, often team-based, video game competitions are now referred—will draw more viewers to a final match than every U.S. professional sports league except the NFL by 2021.

Markets and Revenues

Top tier eSports players, typically in their twenties, are professionals attracting major brand investment and earning a great deal of money, just like their traditional sports counterparts. It's not uncommon for eSports players to retire as millionaires in their late twenties or early thirties. Further, three-quarters of eSports fans are in the 18-to-34-year-old demographic so highly-coveted by advertisers. It should come as no surprise that global eSports revenues from advertising, sponsorship and media rights are ballooning, as a result.

ESports revenues are expected to exceed $1 billion in 2019, a 27 percent increase over 2018's $865 million, according to gaming industry analytics firm Newzoo, with brand investment accounting for over 40 percent of the total. Based on that trajectory global revenues could total $1.8 billion by 2022, Newzoo predicts. North America is expected to generate the lion's share of total revenue in 2019, around $409 million, with China contributing $210 million or 19 percent and South Korea 6 percent. The rest of the world is forecast to account for nearly 40 percent of the total.
In short, eSports competitions are attracting a significant chunk of a key demographic, and the money is following.

In Germany, for example, McDonald's has ended its partnership with the German Football Association and is instead increasing its sponsorship in eSports. In the U.S., Bud Light was named as the official Overwatch League beer sponsor for the 2019 season after AB InBev partnered with the league.

According to analysts, there were 270 million global eSports fans in 2016. That number is likely to exceed 450 million by the end of 2019 and, at the expected rate of growth, reach 645 million people by 2022. While eSports is a global phenomenon, most of the audience—57 percent—is in the Asia Pacific region, according to one analysis. Europe is the second largest market, with 16 percent, North America is third at 14 percent and the rest of the world accounts for about 15 percent.

Worldwide, over 201 million enthusiasts are expected to watch professional eSports content more than once a month in 2019. By 2021 in the U.S., say analysts, there will be 84 million eSports viewers, compared to 79 million MLB viewers or 63 million NBA viewers, although the NFL is projected to retain its dominance, at 141 million viewers.

Activate's analysis suggests that 70 million people could be watching a single eSports final by 2020, by which time consumption of eSports will have reached 3 billion hours, or 10 percent of all sports viewing.

The Mainstreaming of eSports

With so many fans and so much money involved, eSports and traditional sports are beginning to display more similarities than differences. Video game developers have borrowed from the playbook used by traditional sports to help grow their audience, establishing leagues and investing heavily in major competitions. As an example, one developer offered a purse of over $25 million for its annual tournament in 2018, which is more than twice that of the PGA Tour's U.S. Open golf competition prize.

Developers have also begun to establish a pipeline from student to superstardom modelled after traditional sports leagues. Robert Morris University Illinois became the first university to offer gaming scholarships with the addition of eSports to its varsity lineup in September 2014, joining 103 institutions of higher learning in the Collegiate Star League to compete in League of Legends. At that time, there were also more than 750 schools in 46 states and eight Canadian provinces participating in League of Legends High School Starleague, or HSL. By the end of 2017, the 110-member National Association of Collegiate ESports had disbursed over $9 million in scholarships to students.

Traditional sports organizations are also getting in on the eSports action, further blurring the line between them. The NFL, NBA, NHL and MLS—all but one of the major U.S. sports leagues—have announced eSports leagues or competitions. The International Olympic Committee and game developers convened at the ESports Forum in Switzerland in mid-2018 to discuss possible future cooperation between the Olympics and eSports communities. ESports was included as a demonstration—a route to inclusion in the Olympic Games previously taken by several traditional sports—in the 2018 Asian Games in Indonesia and will reportedly be an official medal sport at the 2022 Hangzhou Games in China. The Asian Games are the world's second largest multi-sport competition after the Olympics.

ESports venues have been popping up worldwide over recent years, especially in its largest market, Asia, where regular competitions are held in Singapore, Shanghai, Beijing, Guangzhou and elsewhere. In the U.S., there are eSports venues in the Bay Area, Southern California and in Arlington, Texas, which, with a capacity of 2,500, is currently the largest in the country.

In May 2019, Full Sail University in Florida unveiled The Fortress, the largest collegiate eSports arena on any college campus in the United States. Comcast Spectacor, which owns the Philadelphia Fusion, a team that competes in the Overwatch League, has announced plans for a 3,500-seat eSports venue to be opened in South Philly in 2021. The $50 million, 60,000-sq.-ft. venue will include a training facility and a broadcast studio.

In late 2018, mega-retailer Walmart announced the opening of ESports Arenas at five of its locations in the U.S.—Colorado Springs, CO; Fort Worth, TX; Roseville, CA; Spokane Valley, WA; and Tulsa, OK. A collaboration with global venue and production company ESports Arena, which opened its first U.S. location, a 1,400-capacity venue in Santa Ana, CA, in 2015, the five in-store venues host league competitions and tournaments while also promoting Walmart's eSports computers and merchandise.

ESports Arenas also collaborated with HyperX, Allied ESports and MGM on the conversion of a former nightclub at the Luxor Hotel into the HyperX ESports Arena Las

Riot Games' Head Office

Riot Games' Control Centre

Vegas. The 30,000-sq.-ft. multi-level venue, which opened in March 2018, includes a competition stage and a network TV-quality production studio. In mid-2018, ESports Arenas opened its third U.S. location, a 16,000-sq.-ft. venue in Oakland, CA.

In a further sign of the mainstream embrace of eSports, William Hill at the Downtown Grand in Las Vegas was the first sports book in the U.S. to take eSports betting action.

eSports Broadcast Platforms

ESports competitions are typically broadcast to a variety of specialized internet-based platforms, including Twitch and YouTube, for viewing on handheld devices and computers as well as gaming consoles, but are increasingly being picked up by traditional outlets. For example, NBC Sports has broadcast eSports competitions on various platforms including Telemundo Deportes and, in certain territories around the world, Syfy. One game developer has signed a deal with Disney to bring its league to ESPN and ABC.

Turner's ELeague is streamed online and is broadcast on TBS, attracting 9 million viewers. ESports magazine partnered with Big Ten Network in early 2019 to stream competitions between the 14 Big Ten schools on Caffeine TV, Twitch and YouTube during the BTN League of Legends Season, part of Riot Games' College League of Legends Season.

Twitch, which was originally dedicated solely to video games when it was founded in 2011 but has expanded its content to include music, talk shows and TV series, is the principal viewing platform for eSports. Amazon acquired Twitch for nearly $1 billion in 2014 and it is now one of the highest sources of internet traffic in North America.

Reported figures reveal that about 5 million viewers spend 106 minutes each day watching live gaming, which is several times the number that typically tune into U.S. cable news programming nightly. Broadcasts and videos on Twitch are free and can be viewed on the platform's website or through an app on handheld devices, as well as via popular game consoles and network appliances such as Google Chromecast.

League of Legends Leads the Pack

The most-watched live eSports coverage in 2018 was Riot Games' League of Legends, with a total audience of 347.4 million on Twitch and YouTube. Second was Valve/Hidden Path Entertainment's CS:GO (Counter-Strike: Global Offensive) with 274.9 million, followed by Valve's DOTA 2 (the sequel to Defense of the Ancients) with 250.4 million, Blizzard Entertainment's Overwatch with 101.3 million and Blizzard's Hearthstone with 54.1 million.
In 2018, for the first time, Riot released its average-minute-audience statistics for the League of Legends world finals, reporting that its global average audience was 19.6 million viewers. Hosted in South Korea, the finals peaked at an audience of 44 million concurrent viewers.

League of Legends (LoL), a multiplayer online battle arena (MOBA) game, supports 14 regional professional leagues around the globe, encompassing 113 professional teams and over 850 salaried athletes, overseen and operated by Riot Games. Teams attract sponsorship from globally recognized brands such as Adidas, Alienware, AMD, Logitech, Monster Energy, Mountain Dew, State Farm and Volvic. In 2018 Riot signed a first-of-its-kind multi-year global deal with Mastercard.

For the annual 21-day-long LoL world finals tournament, two-dozen teams—144 players—qualify from the regional leagues. Viewership topped 1.2 billion hours watched over the course of the three-week competition for the world finals in China in 2017, with the most-watched match attracting more than 80 million live unique viewers. The 2018 Worlds in South Korea pulled in 99.6 million unique viewers, a very healthy 25-plus percent increase from the previous year's event. Worldwide, regular season viewership averages 90 million hours-watched live, week-over-week.

But eSports fans are not just watching these events at home or on the move. More than 23,000 fans packed Incheon's Munhak Stadium for the 2018 LoL Worlds in South Korea, where teams competed for a prize pool of over $6 million – the largest yet for the event. Over 40,000 attended the 2017 Worlds at Beijing's National Stadium, also known as the Bird's Nest. Venues in previous years have included the Mercedes-Benz Arena in Berlin, Madison Square Garden in New York City and the Staples Center in Los Angeles. The 2019 Worlds will be held at the 20,000-capacity AccorHotel Arena in Paris and will return to China in 2020, with North America again hosting the tournament in 2021.

Distribution Platforms and Infrastructure

The 2018 LoL Worlds were broadcast in 19 different languages across 30 platforms and television channels, including Twitch, YouTube, ESPN+, OGGN, Facebook, Syfy and TNT Sports. How Riot typically produces and distributes its tournaments is potentially a signpost to the future of sports television broadcasting.

Riot Games is headquartered on a 20-acre campus in West Los Angeles, where one of its buildings houses a fully-equipped broadcast facility, and maintains 23 other offices worldwide. Riot has been employing REMI or at-home remote audio and video production workflows for several years, producing broadcasts of the League of Legends Championship Series (LCS) in North America and Europe, the international Mid-Season Invitational (MSI) and the League of Legends World Championship from its L.A. facility. Production of European competition broadcasts have been transitioned to the LoL European Championship (LEC) studio, which was built out at Riot's location in Berlin, one of Europe's major eSports hubs, where it moved in 2014. The facility features a Calrec Artemis console in the broadcast audio production room while a Calrec Brio acts as a monitor console for the players, with a CEDAR system eliminating distracting crowd noise from their headsets.

League of Legends is a free-to-play GaaS or game-as-a-service, with approximately 120 million monthly active players and around 25 million playing daily. The largest share of players, roughly 25 percent, are in western Europe, according to server traffic, with Korea only fractionally behind that figure. Nordic and eastern European players combined account for about 13 percent.

The GaaS model enables the developer to keep its fans engaged through constant improvements and updates, charging only for premium content. To support that cloud-based model, the company has built out a worldwide private network, the Riot Direct WAN, which interconnects its servers and offices with a broadband pipe. Part of that ISP's bandwidth is reserved for production traffic, which is what allows Riot to remotely produce and broadcast events at venues around the world from its L.A. facility.

Constant Improvement

With all aspects of Riot's broadcast production, the name of the game is constant evolution and iteration in the service of efficiency and resilience. "We'll do the same show 15 times and never once do it the same way," says Matthew Donovan, broadcast engineering manager at Riot's West L.A. production facility. "There's always a way to improve. There's always a change that's going to deliver more value."

Just as broadcast producers have had to find unique workflows and presentation solutions for individual traditional sports, so too must video game developers find a way to best present their specific competitions. "It's unique to each game. You have to know the game, the capabilities and the limitations, and be embedded with the company that makes that game, to be able to visually represent that game in an engaging way for its fans," says Donovan.

"The technical obstacles you need to overcome will be different given different circumstances. The critical part is having a team embedded with the individuality of the games and experiences they're trying to recreate and working with those challenges to create a good technical solution." Happily, he says, solutions manufacturers are making the necessary technologies more accessible. "Things that were more challenging are now a lot easier to accomplish," he says.

The organization is less conservative than traditional broadcast operations, not least because the personnel, like the game's players, are generally younger and, with a few engineering exceptions, are not from a television broadcast culture.

"We don't want to keep doing the same thing. That's not winning; that's failure to us," says Donovan. "If we're not delivering more, pushing things, going for something that's more engaging, then we're failing. This outlook is great when everything goes to plan but we recognize the potential to faceplant. We take failover testing very seriously and it's a critical part of our tech rehearsals on these international shows. Failure is okay if it's on a path to progression, but it's better to fail gracefully and not negatively impact the viewer experience."

IT Management

Like the competitions themselves, Riot's LoL broadcast production is a team sport, and one of the key players is the IT department. When an international event is planned for Vietnam and Taipei, for instance, as in the case of the May 2019 MSI competition, the company's network engineers create a direct pathway between a POP (point of presence) at a nearby Riot Game office — there is one in Ho Chi Minh City and another in Shanghai, as examples — from the Los Angeles POP over the enterprise WAN. Riot's network engineers handle all the planning, routing, switching, InfoSec data security, monitoring and management of the infrastructure for each event.

They also contract with a local or regional service provider to connect over the last mile to the venue.
"We always try to have redundant lines, even two different vendors, where possible," says Donovan. "We try to add as much resiliency into the signal path as we can." Should both paths fail—if internet connectivity is completely lost—a bonded cellular path is typically in place as a failsafe.

At-Home Production

Remote trucks have essentially been eliminated from Riot's production workflow, a transition to an at-home paradigm that has been accelerated by the recent introduction of various solutions from a handful of manufacturers. That transition has also been driven by Riot's simple philosophy: "We try to keep as many people home as possible so they can sleep in their beds," says audio engineer Dave Talavera, a veteran of the broadcast industry who worked for NFL Films during the early 2000s.

Consequently, the audio production mix is handled from Los Angeles. On-site cameras can be controlled, switched and shaded from Riot's facility, and the director calls the show from L.A. Video packages created by Riot's L.A. producers are played back during the show from the facility. While players are looking at their own game on their individual screens, three observers at Riot L.A. can position themselves anywhere within the game, following along and selecting action for replay in the broadcast from within the system, without disturbing the competitors, in addition to also feeding segments to EVS for replay.

For previous championship events, a mix-minus world feed was generated in L.A. from the English-language version of the show and fed to distribution partners to add commentary in their respective languages, either in-venue or at their own facilities. But for the South Korea Worlds, the international feed was generated using a different switcher and a second audio room at the L.A. facility and distributed to every international partner, including the main audio studio in the same building. Riot's English-language announcers called the action from a TV studio just down the hallway rather than from the venue.

Certain functions are still handled locally at the venues. For the time being, an engineer at the venue mixes IFBs for the talent and competitors, who are on Dante-enabled wired packs from Studio Technologies. That mixer also adds redundancy, with the ability to generate and distribute a feed from his desk should all else fail.

But Riot has also used new REMI audio products such as Calrec's RP1 remote production unit, controlled from a Calrec Artemis mixing console at the L.A. facility, for a couple of LoL championship shows in Europe. The RP1 includes DSP that allows latency-free IFBs to be generated at the remote site. Riot Games has installed a Calrec Artemis and a Calrec Brio at its Berlin eSports complex in Germany.

Any company interested in reducing expenses related to its remote productions is likely considering at-home workflows. "I don't want to take away jobs but there are some things that make sense," says Talavera. "We now do roughly 12 remote large-arena shows a year. If you account for airfare, hotel, food, wages and equipment rental, that one IFB mix position is easily $50,000 to $60,000."

Signals and Transports

A typical international event includes 30 or more inbound live 1080p60 video signals

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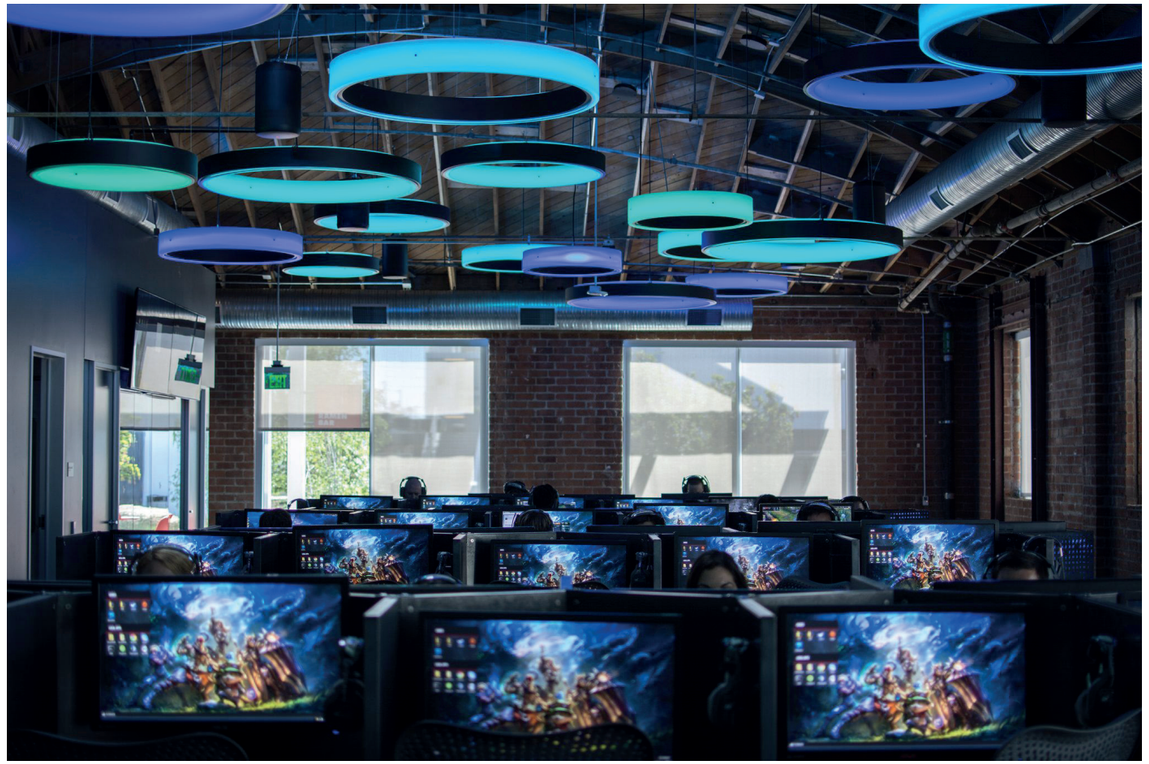


Riot Games' PC Cafe

to Los Angeles plus 10 to 15 outbound, together with an average of 40 inputs of audio from the remote site. Ten cameras are dedicated to the two competing five-person teams. During finals, which include opening ceremonies featuring live entertainment and musical performances, audio will fill a 64-channel MADI stream. "We typically put out eight to 10 audience mics and we have camera mics—the same stuff you would see in a traditional sports broadcast," says Talavera.

Until two years ago, as the Berlin regional operation began to come online, the L.A. facility would handle productions for North America and Europe from Wednesday through Sunday every week for 40 weeks a year. During regional playoffs, there could be arena shows, each up to six hours long, on two continents back to back. "It was so much fun," says Talavera. "When the first show is over, toss to commercial, three and a half minutes later, press a couple of buttons and it's switched over.

Another crew would walk in during the break. It was like a Swiss watch."

Previously, signal distribution was handled by an Evertz ATP (Advanced Optical Transport Platform) over SONET (Synchronous Optical NETwork) pipes. That system could handle six MADI streams, says Talavera, including primary and backup streams for audio and for comms. A primary and a backup MADI stream from the second venue enabled the crew to prep that show's broadcast before switching over, he says. Since the L.A. facility now has an in-house Riedel comms system, productions use VoIP to communicate with the remote location rather than sending MADI tielines.

"To attach ourselves to a manufacturer that had to have bigger pipes limited us," he says, so Riot has iterated its at-home production infrastructure, at the same time adopting a Haivision transport that significantly reduces bandwidth requirements. Instead of taking up 8.7Gb over SONET lines using JPG2000 compression the bandwidth has been reduced to 1.3Gb, says Talavera, while handling additional paths and encoders. "At Worlds in South Korea we did upwards of 40 encoders in under 1.5 gigs. It gives the production way more flexibility."

IP and Codec Issues

At the venue, audio is sent through a router and into a Nevion multi-format contribution codec, which encapsulates the MADI stream. In L.A., the incoming signals are routed to the Nevion decoders then into the mixing console. Video signals are converted to baseband and fed into the switcher. "It's no different than having a truck," says Talavera.

Processing time through the H.264 video encoders takes longer than the audio equivalents, so Talavera and the Riot engineers use the delay capabilities of the Nevion decoders in combination with Lawo's V_remote4 IP remote production processors to resynchronize sound and picture on a per-channel basis or across an entire stream. The Nevion has a 200 mS buffer with the Lawo offering an additional 320 mS. On one recent remote Riot's engineers had to introduce nearly 400 mS of delay for the worst case, Talavera says.

"We've been playing around with RAVENNA and other ways to get audio in via IP but it's not consistent, whereas Nevion is very consistent," says Talavera. The L.A. facility produced the 2017 North America LCS summer finals from Boston's TD Garden arena using RAVENNA, he says. "But that was a dedicated pipe, 10-gig SONET lines."

In addition to latency issues, working with IP transports also requires the production to carefully manage firewalls and potential IP address conflicts. When two back-to-back shows are leapfrogging, says Talavera, relevant production components must be on a separate address for each show. "We may have a 10.22-whatever network," he says, referring to the class A block of IP space reserved for private networks worldwide. But the two productions can't be tied together over the same address, so for the second show the paths need to be assigned to different addresses.

"That's time consuming," he says, and while Riot's network team handles the overall IP plan, it's often up to the audio engineers to handle their own switchovers – until they find an automated solution, anyway.

Different Mindsets

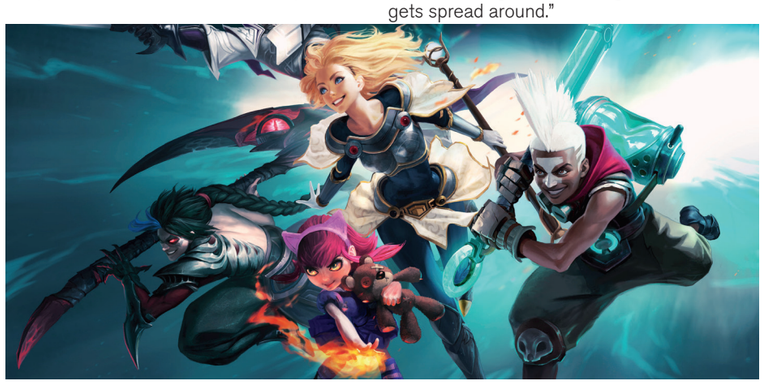
Of the 18 or so distribution partners, only the four with the largest audience can de-embed the multiple stems, isos and other sources they need to build their own shows.

Although surround formats are supported by Twitch and YouTube, for the moment events are produced in stereo. Most of the partners can only take a 2-channel mix in any case, says Talavera. "They take it off YouTube. It's crazy, but they do it and it works, and people watch it on all sorts of devices, including phones."
For anyone coming to eSports from a television broadcast culture, it requires a change of mindset, he says. "It's so not what we're used to."

Of course, it may be that Riot's production workflows are simply not applicable to traditional broadcast.

"What we're doing is a little unique for our industry, but what we do works for us," says Donovan. "It may not work for the larger broadcasters."
And while automation and at-home workflows will likely bring about a reduction in production personnel, that's not necessarily a bad thing, just different, Donovan says, and ultimately should make for a better final product.

For those personnel concerned about the impact of eSports and the broadcast workflows associated with it, he says, "It's breaking down the walls of traditional sports. You can have more shows, more games. There are more outlets, more eyeballs. So if you're willing to learn and grow, that work gets spread around."



League of Legends Promo Art

The Fortress

The Fortress eSports arena at Full Sail University powered by Brio

In 2019, Full Sail University launched "The Fortress" a $6 million, 11,200-sq.-ft. esports arena. The facility is the largest gaming arena on a U.S. college campus and can seat up to 500 spectators.

It is home to Armada, Full Sail's collegiate esports team, as well as a host of third-party gaming events, collegiate tournaments, live-streamed esports competitions, and live concerts.

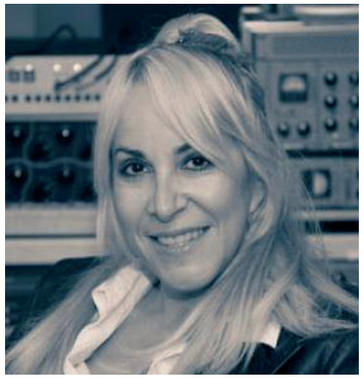
"Full Sail has a unique ecosystem, in which students are intimately involved in our live productions. In addition, gaming is very much a part of our culture here through our game-design and development [programs]," says Vince Lepore, director, event technical operations, Full Sail University. "I think Full Sail is uniquely positioned to be a leader in esports."

The audio room features a Calrec Brio 36 console (fitted with Dante, MADI, and Waves I/O cards), Calrec Hydra2 fixed format I/O (48 in, 16 out), Waves Soundgrid Server One, and Genelec monitors and subwoofer.

With thanks to SVG for this story

Craft Interview: Jeri Palumbo

Jeri Palumbo on how mixing for eSports is a world away from sports



Jeri Palumbo

Can you provide some background on who you are and what you do?

I have nearly 30 years of technical experience, ranging from live audio engineering of major league sports and entertainment broadcasts to being a recording engineer/producer and arranger, where it all started. I also have a background in IT technology and dabbled as an Avid editor. My first real job, though, was in marketing and merchandising for Radio City Music Hall.

How did you get into the broadcast audio business?

As a composition orchestration major at Juilliard, I was hired to do an orchestration/arrangement for an artist who was making a small indie record in New York. As the musical director on the project, I would sit with the engineer for the mix-down and part of the tracking. The engineer on that project was using a Fairlight — an audio wave manipulator that was kind of like a precursor to Pro Tools — and it really just rocked my world. It was the first time I ever encountered that type of tool and I was fascinated by it.

I started hanging out with the engineers and watching what they were doing — how they were tracking and capturing sound — and just kind of following them around. That's how I ended up on what I call, "the other side of the glass."

To be fair, I grew up recording and "hacking and splicing" tape before I even knew what I was doing. Being from a family of musicians, we always had various recording equipment options around, one being a reel-to-reel Revere tape machine; which I still own today. I used it for every single recording I made from about six to 18 years old, when I went off to college.

What challenges come along with being a woman in audio/broadcast?

You really have to know your stuff – and even when you know your stuff, I feel women get questioned more than our counterparts because engineering is still a male-dominated industry. When I walk into a new environment, even though I have 27 years of experience, I often face the same misconceptions. The best answer I have found to this is to do my job well, surround myself with good people and never second-guess my abilities.

Every time someone asks me about this topic, I reference the Paul F. Davis quote: "Go where you are celebrated, not where merely tolerated." I truly live my life by that viewpoint — I make my career decisions by it and I stand by it.

How have you seen audio technologies evolve over your career? How has this changed sports programming and the way in which you work?

It's gotten far more complicated; there are far more responsibilities on the A1 than there used to be. We have progressed significantly in the way we handle our source material and the way we disperse it — and that's all been through the digital age and products like Calrec. Brands that could foresee what was coming, and tried to find a way to not only condense it, but also find different ways to matrix that out seamlessly has really helped the day-to-day for A1s.

There is just so much that we're now doing for domestic feeds, or any other feeds, that we didn't normally do years ago. We've added 5.1 mixes, when it used to be a stereo out. We've added multiple stereo outputs simultaneously for music cuts. We've also condensed a lot of elements that would have been impossible to handle by one person.

One thing that has not changed for the A1 in the sports broadcast world is that we are still responsible for all the comms as well.

In the entertainment world, you rarely see an A1 mixing their own comms, but we still do that in the sports broadcast world. So now our job is far more complicated — but the technology, and we as engineers, have also come a long, long way.

What Calrec consoles do you use during broadcasts and what are some of the standout features or functions that have been helpful?

I use Calrec's Artemis console – the 5.1 direct out is extremely helpful for me because I use it all the time, along with the auto mix. For me, this feature is not so much about the auto mixing, but rather the fact that I never have an issue with volume wars between commentators/reporters, and I know that has a lot to do with the auto mixer on the console. The parametric EQs can be copied from fader-to-fader, and the Artemis' compressors are dynamite and work seamlessly for me. Also, I use the cloning functionality all the time for my workflow. I make homes for my original sources and I clone everything from my top sources. So, cloning, 5.1 direct out, auto-mixer, parametric EQs and great-sounding compressors are all invaluable tools from Calrec; I use these all the time.

How does mixing for eSports differ from traditional broadcast sports?

Mixing for eSports is dramatically different than live sports. For one, there is a significant difference in the air-time between the two; eSports can be live for sometimes 12 hours, or more, depending on the length of a round. But, the other, significant difference is that live sports is somewhat predictable, whereas eSports is like the wild west. But, that's the fun part.

eSports is mostly Web-based with a lot of audio elements being sent to and stored online while you're doing the broadcast, versus traditional live sports, which have direct audio runs. In eSports, a typical audio workflow includes a direct output from between four and eight players' computers, which feed to literally hundreds of players. Or, the audio sources are stored in the cloud, which we access in real-time. This sourcing is ever-changing between games and needs. One way we might have to work is feeding into an observer position/computer matrix, a room full of people who are watching all the screens and cutting between those sources, including the independent audio feeds. At other times, we sourced through Tricasters (a switcher-like device) for game output, or even directly from the web.

As the A1, you are tasked with figuring out a way to collect all the audio into one source. In addition to each players' game audio, you have the main audio from the gameplay itself – the sounds and music built into the AI of the game – as well as that from each of the players' headsets because they are also interacting verbally.

Added to that are the sheer number of rounds throughout the competition and the multitude of players at one time. In these cases, we would sometimes "demux" the audio and split it from its embedded source. Sometimes I use the observer position audio feeds, but even that can be complicated. We can choose to focus on just one observer or utilize the pooled clips and audio that are being collected rather than the separated tracks.

In addition to the complicated nature of all the audio ins, we also traditionally mix to both 5.1 and live broadcast stereo formats. During a recent gaming event, I was tasked with the most complicated scenario I've ever encountered in my career; to mix a live broadcast while simultaneously mixing and sending an immersive surround 5.1 to the house...with no front-of-house. To be clear, this workflow is not something I would ever choose, because there is so much that could go wrong, but, that was the option I was given at the time of this particular launch. We hit the Meyer Galaxies direct from the Calrec Artemis and had the

Jeri Palumbo with her partner, recording engineer Erik Zobler

Calrec Artemis Console

feeds broken down by zone. Doing a FOH alone with the immersive surround would be complicated enough and the only reason this format worked was because the audio crew and support from the Calrec LA team was stellar.

What are some of the important elements to mixing for eSports?

I typically build my layers early in the game knowing that I will likely change my layer layout each time a new game comes on-board. For my most recent eSports project, I had 12 layers of 32 channels on the Artemis, and I layered every single element out that was in the studio. I put libraries on the bottom layer so that at any point in time, I could clone them so that I always had them available while I was mixing. Once I had everything stacked, everything would go to the bottom two layers. I had one layer dedicated strictly for transmission because we also had 5.1 going to the floor. When it came time for transmission, I went to that layer and got it locked up quickly. The cloning aspect to my workflow saved me invaluable time because I always had the elements there and it kept me from accidentally deleting something.

Additionally, since this was an unusual situation where we were running a 5.1 mix to the floor with no front of house, I built in a redundant system. I had one layer of stems, 5.1 to the floor broken out completely and then I had all my stems collapsed in another section so all I had to do was move one fader and I would still be hitting all of my 5.1 speakers via the Calrec Direct 5.1 output feature. In other words, I could stem it out to the floor individually or 5.1 direct-out in seconds, if needed. I had a backup plan because anytime somebody asked me for a particular stem on a different speaker send, I would immediately have it.

Can you share any unique aspects about your workflow using the Artemis?

There are some really unique things about the Artemis that are brilliant. This includes the auto-mixer (and not being afraid to play with it) and great-sounding parametric EQs and compressors, but, for me, the biggest “a-ha” is the way Calrec does its matrix out. I was able to get really creative with how many IFB sends I had, with the cloning feature and 5.1 direct outs. I set up as many IFB totals and audio feeds as I could and I’d only matrix out each according to the game requirements. For me, no matter the application, I build my shows with every aspect that I can possibly conjure up and have them on the board and ready for recall, whether it’s IFBs, floor-sends or any other request.

In eSports, I often do a direct out 5.1 from the Calrec, which allows me to send a 5.1 out down one path instead of having to break it out into an individual-pack stems, although I keep a layer of 5.1 stems ready at all times as well. For me, that’s a brilliant option because you don’t have time to do a 5.1 immersive mix while you’re doing a broadcast. I keep that structure throughout all the shows, and I only have to adjust the top layers between each broadcast.

Where do you see the future of sports mixing going in the next five years?

There’s a very clear shift to IP, similar to how things were in the analogue to digital changeover. Localized IP networking is now being set up at the site itself, for cameras, audio and various other components, eliminating the need for a full staff on-site. The technology has been around, but it’s now being used at a far greater, more sophisticated and intelligent level. There are all kinds of ways that delivery is transitioning to IP, and people are now taking advantage of that to the point where I actually think it’s going to change the television landscape forever. Actually, look at the way we access content now – the change is already here.

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