INTRODUCTION

The fast-paced world of live sports production is a breeding ground for innovation. Now Epsio Zoom takes advantage of Ultra-HD’s much higher visual resolution, enabling 4K zooming and detail for a considerably more immersive and enhanced consumer experience. As numerous sports organisations in many regions of the world test and utilise 4K, the ability to zoom into any portion of selected content is critical to delivering on the promise of 4K.

BACKGROUND

The vast majority of the world’s outside broadcast trucks and multi-camera studios are equipped with servers from EVS. As the market leader, it clearly falls to EVS to deliver a solution for 4K (also known as Ultra-HD, UHD and UHDTV) recording and replay. Getting more from your content - from better quality and higher resolution productions or adding value to existing services - is driving the need for 4K productions. EVS understands the challenges facing the industry and provides solutions to enable an enriched live production environment for quality content that is delivered more quickly, more creatively and more efficiently to the consumer.

RISING 4K ADOPTION

While the idea of video at 4K resolution has been around for more than 20 years, since the early days of digital intermediate post production for film-originated projects, it was felt that a scanning resolution of around 4000 pixels across the frame was required to capture the full detail of 35mm film.

Since the first broadcast system cameras and camcorders capable of 4K resolution were introduced in 2013, the market is now exploding. Today digital cinematography cameras predominate and moviemakers use many resolutions, including Ultra-HD. We’re also seeing 4K being used for television - for reality-based programming as well as scripted shows. In the 2013 season some Saturday Night Live production team members experimented with 4K workflows to master the format, indicating NBC’s and SNL’s interest in using 4K to future proof content. Netflix has given strong hints that it will offer select content in 4K: its own 2013 production House of Cards was shot in Ultra-HD (although posted in HD).

A recent survey in the UK conducted by hire company Procam found that 49% of producers said they expect to film some UHD content by the end of 2014.

THE SPORTING LANDSCAPE

As is often the case, the sports world is the true early adopter of new production technologies. If an innovation allows you to create better, clearer, more engaging sports coverage then it has a good chance of succeeding in the broader consumer marketplace. Today’s savvy sports fans expect to see key action sequences from different angles and at different speeds, to understand what happened and appreciate the skills involved.

Outside broadcast trucks now routinely include large numbers of server channels to provide these replays, including slow-motion playback. Audiences are going to expect the same production elements and will reject 4K if it means they have to lose these insights. Server recording and replay of multiple camera channels is a vital requirement.

Numerous sports organisations in many regions of the world are currently utilising or testing 4K, or implementing the format to future proof their content. In the US, FOX Sports has been using a Sony F55 to cover football because its 4K resolution is nine times that of the channel’s native 720p delivery so it can zoom in for crisp replays.
4K ZOOMING

Used along the sidelines, at the edge of race courses or courtside, 4K cameras can capture large-format images of extremely high quality, with zooming focused on delivering up-close clarity for dramatic plays and controversial calls. HD cameras and integrated 4K workflow provide premium flexibility. Operators can enjoy HD or SD content and zooming capability from one system, at any moment.

INTRODUCING EPSIO ZOOM

Epsio Zoom for 4K zooming allows operators to scale any 16:9 region within a 4K frame to HD - in real time. Operators can make a split decision to zoom into a shot and capture a very high-resolution image. Epsio Zoom makes it easy to provide clearer close-ups of any content highlights - from controversial calls to key replays - bringing viewers even closer to the action.

As the majority of the world’s outside broadcast trucks and multi-camera studios are equipped with servers from EVS, Epsio Zoom fits easily into a streamlined workflow with the 4K XT3 server. The XT3 server platform was designed to be flexible and future-proof, with massive internal bandwidth and processing power. Its flexible configuration allows bandwidth, I/O and storage capacity to suit the application, and easily accommodates the four 3G-SDI feeds required to carry an Ultra-HD signal. This allows operators to use a standard LSM control panel to manage 4K recording and replay functions.

Most importantly, all required information and interface control is located within a single device.

EPSIO ZOOM WORKFLOW

Epsio Zoom is integrated into a simple workflow. An operator identifies the 4K content, either via a touchscreen or a mouse and then simply selects the specific part of the high-resolution image for zooming. The resulting zoom sequence can be used for the HD live diffusion as a regular instant replay.
In a slightly more complex scenario, a first operator reviews all UHD content, selecting and zooming, and preparing sequences. A second operator receives feeds from other cameras, as well as the 4K-zoomed content, and prepares clips to be sent to air.

When an operator generates the zoom sequence, Epsio Zoom triggers creation of a clip on the XT server used in the regular HD production. Zooming can be used as a new effect during a sequence, zooming from a general view to a detailed view and back to enrich the clips.

The processing capacity of the XT3 is powerful enough to support three 4K channels, either two records and one replay or one record and two replays.

**USE CASES**

EVS has been at the forefront of 4K innovation since its inception, taking part in a January 2013 production with Kyodo TV in Japan. While some organisations are still testing, others have moved to implementation, using EVS Epsio Zoom to create 4K clips and highlights for air.

In the US, FOX Sports has been using Canon C500, Sony F55 and Sony F65 cameras to cover football because its 4K resolution is nine times that of the channel's native 720p delivery so it can zoom in for crisp replays.

**GETTING YOU CLOSER – EUROPEAN FOOTBALL**

In a first for European football, a major league used a 4K camera exclusively to follow the ball and zoom into the action to retrieve details and subtleties undetectable to the naked eye. Now, after repeated successful tests with Epsio Zoom, they plan to increase use of the technology for weekly games.

**MORE CLARITY FROM THE MOUND - US BASEBALL**

For the high-profile all-star game of a major US baseball league, a leading American broadcaster experimented with 4K zooming extraction on the baseball diamond. 4K cameras recorded at one particular base and in the event of a close race to the base or an unclear call, Epsio Zoom enabled zooming to reveal the details. Operators were able to create and play a 4K clip while zooming in and out several times, saving the footage as a new HD clip featuring the zooming action. The test was successful and the customer was extremely pleased, both with the quality of the zoomed content and the ease of the workflow.

**MAKING THE CALL – US FOOTBALL**

The dominant national football league in the US uses Epsio Zoom not only to zoom into key action sequences but also for decision making, providing proof for close and controversial calls. The zooming resolution and clarity make it easy to see if a foot has inched over the goal line or a ball has touched an outstretched hand.

Sports may be leading the way in the use of 4K and zooming technology, but the entertainment industry is following closely behind, using UHDTV for reality programming and scripted shows.
STANDARDS AND KEY SPECIFICATIONS

In 2012 the ITU published its recommendation 2020, which codified ‘ultra HD’ formats (as the consumer electronics industry calls them). As well as 4K, rec 2020 also covers the Super Hi-Vision 8K system developed by broadcasters led by NHK of Japan.

The standard defines 4K television as 3840 pixels on 2160 lines: double HD resolution in each direction. It only recognises progressive scanning, so the basic 4K resolution has eight times the bandwidth requirements of today’s HD, or four times 1080p. Rec 2020 includes a number of frame rates up to 120 fps, and colour sampling bit depths of 10 or 12 bits, the latter giving an extended colour gamut.

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<th>Zoom 100%</th>
<th>Full 4K image is used for HD feed</th>
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<tr>
<td>Zoom 200%</td>
<td>( \frac{1}{4} ) of 4K image is used for HD feed</td>
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<td></td>
<td>Full resolution in 1080p, 1080i</td>
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<td>Zoom 300%</td>
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<td></td>
<td>Full resolution in 720p</td>
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In practice, current developments in 4K creation and manipulation are for 3840 x 2160, 50 or 59.94 progressive frames a second, and 10-bit 4:2:2 colour sampling. This means signals can be transported as a bundle of four 3G HD-SDI signals, allowing existing infrastructures to be retained just as two HD-SDI signals were bundled to provide 1080p architectures before 3G capabilities were developed.

It’s worth noting that the ITU definition of 4K for broadcast applications is significantly different to the Digital Cinema Initiative’s DCI standard for 4K movies, which is a widescreen 4096 x 2160 aspect ratio, with 4:4:4 12-bit colour sampling.

CONCLUSION

It feels like only months ago the landscape for 4K was viewed with a great deal of scepticism. Just how much value does UHDTV hold? How much will its benefits matter to the consumer and at what price point does it become viable? While these issues can still be debated, it’s clear that 4K is here to stay and being adopted faster than many expected.

Enriched, more compelling content is a goal shared by all links of the production workflow, whether for sports, entertainment, media or news. Epsio Zoom gets more from your raw content: better quality, higher resolution and more detail for productions that add value and provide a better viewing experience.
CUSTOMER SUPPORT & TRAINING

Our clients range from TV stations to video equipment rental companies and production houses worldwide. EVS’ key priority is to make sure that its clients keep performing at the highest possible level. We listen to our customers, identify operating workflows, anticipate needs, and suggest effective and reliable solutions, so that they in turn can offer top-quality productions to millions of TV viewers across the globe.

CUSTOMER SUPPORT

EVS is dedicated to making sure its products are functioning in a way that meets your needs and expectations. We offer technical support 24/7 from each of our regional offices, so you can rest assured that someone will always be available to answer any question that may arise.

All members of EVS’ technical support team are qualified technicians with a solid background in broadcasting. They understand your requirements and can provide you with the best solution available.

TRAINING

Do you want to learn how to operate EVS systems and applications or enhance your skills in using our tools?

EVS Training offers a series of courses on how to operate its products, taught in-house by industry professionals. Some of the training sessions are conducted by the EVS team via a Web interface, so that you get hands-on instruction even at a distance. EVS User Guides and technical documents are available free-of-charge on our Website.