Fraunhofer
DIGITAL MEDIA

FRAUNHOFER DIGITAL MEDIA ALLIANCE

RE-THINK MEDIA PRODUCTION

TRENDS AND TECHNOLOGIES IN DIGITAL MEDIA

Issue 7

RE-THINK MEDIA PRODUCTION

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PREFACE

Re-think media production – this implies bringing all sophisticated ideas and cutting-edge technologies to application-oriented production levels so that users can go "live" with these innovations.
With codecs and formats like HEVC (High Efficiency Video Coding), OMAF (Omnidirectional Media Format), and MPEG-H Audio, we are now moving to ready-to-use technology solutions. These implementations and systems meet the requirements for 4k and 8k video and for 3D and object-oriented audio in broadcast and streaming applications. The new codec JPEG-XS completes the way to IP-based workflows in professional production.
Streaming 360° content and VR also profit from these high-performing options and enable production and distribution for new 3D consumer experiences.

3D spatial video becomes one of the essential production methods for enriching media content and combining real and virtual objects into one holistic media experience. With volumetric video production and light field, we present some of the most-promising new technologies.

The Fraunhofer Digital Media Alliance has been contributing to the future of media with revolutionary developments, contributions to standards, and award-winning technologies for many years. For example, 2018 is the 10th anniversary of our renowned easyDCP software suite, which is used worldwide for DCP and IMF mastering.

Enjoy reading it!

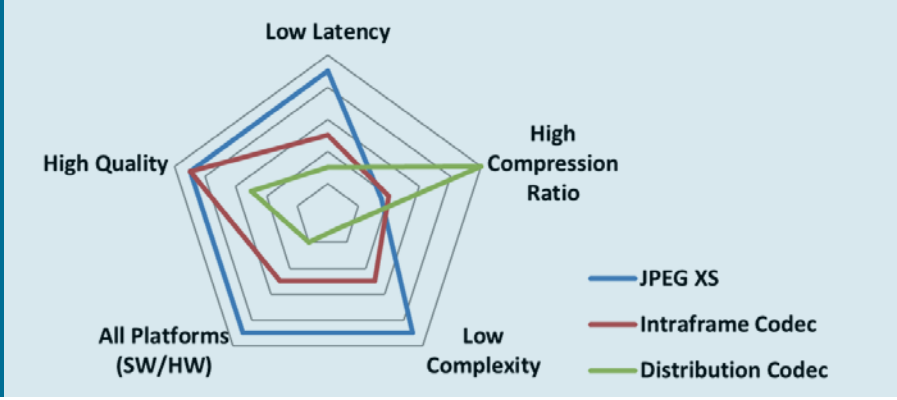
JPEG XS: THE NEW HIGH-QUALITY IMAGE CODEC FOR VIDEO AND MOVIE PRODUCTION

The broadcast operation center today is the heart for switching and mixing of video signals, either to integrate special effects, to overlay text or images, or to mix foreground and background scenes. For this purpose, the broadcast operating center routes thousands of video signals and combines devices like contribution receiver, video mixer, encoder, monitoring displays, and many more. But the era of using dedicated video signals like SDI (Serial Data Interface) is coming to an end.

The next step into the future is to use more and more COTS (commercial off-the-shelf) devices like IT switches to route and distribute all signals in a broadcast operating center. This is also true for video signals.

To allow distribution of video signals over IP (Internet protocol) and to use COTS devices, specific arrangements have to be made. One is to embed the video signals into transport layers, but it is also beneficial to reduce the amount of data by compression. The reason for that is that an uncompressed video signal like UHD (4k video) with 60 frames per second has a data rate of around 10 Gbit/s and the transmission of such a signal is still demanding and expensive. For this reason, the JPEG committee collected requirements for transport of high-quality signals over IP and started two year ago with a codec project called JPEG XS. The first parts of this new standard are now close to finalization.

The new codec shall guarantee interoperability between different devices, preserve the highest quality, use a low number of computational resources, and shall allow for multiple encoding-decoding cycles in an image-processing pipeline without image degradation. In addition, a low latency for transmission over IP is necessary



Essential criteria for codecs in Video over IP

so that the image quality at the end of the pipeline can be inspected immediately without further delay. To allow integration into all interfaces and devices, the architecture of the codec was important. So a high degree of parallelization was one design criteria to allow the implementation on CPU, GPU, FPGA, and ASIC platforms. The processing of UHD with 60 frames per second on a standard PC was a target and could be reached.

At IBC, the data compression experts from Fraunhofer IIS will demonstrate the use of JPEG XS in a plugin for Adobe Premiere that will allow reading and playback of JPEG XS image sequences in real time. In addition, they will show a streaming pipeline where they capture images with a camera, encode the data in real time on a standard PC, transfer the stream over an Ethernet IP link to a second computer and decode the stream on a display.

"In general, we are offering an SDK with optimized functions for encoding and decoding of JPEG XS on CPU and GPU platforms. This allows system integrators to benefit from our developments and to achieve the highest performance. The SDK can be used in devices and applications of the system integrators", explains Siegfried Foessel,

JPEG XS is designed to preserve the highest quality while also consuming a low number of computational resources and guaranteeing a very low latency. This is important especially in the production environment. This allows for integration of this codec into any interface or monitor. Other codec families are targeting a higher compression ratio for distributing of signals to the end user (distribution codec) or are not optimized for low latency and lowest complexity (intraframe codec).

New standards – MPEG-OMAF and HEVC – for more enjoyment of TV and VR

Whether it's a quiet evening on the couch in front of the TV or with VR glasses on your face: the higher the picture and sound quality, the better. Special codecs from Fraunhofer laboratories help to ramp up both picture and sound quality.

The TV picture is razor sharp and you can make out every detail. It's the HEVC (High Efficiency Video Coding) codec that makes this possible. It can be used to provide TV screens with 4k images, as it's the codec with the highest compression efficiency. This means that it compresses the video data much more efficiently than other standards and thus allows larger quantities of data to be transmitted – while also keeping operating costs low. HEVC was developed within a joint standardization activity comprising ITU-T and ISO/IEC by renowned technology companies and researchers at the Fraunhofer Heinrich Hertz Institute HHI.

The previously common compression standard H.264/AVC is not able to efficiently handle a 4k resolution.
At the 2018 FIFA World Cup, this advantage of HEVC was plain to see: "HEVC is the only video standard used for the transmission of live sport events in 4k", according to Benjamin Bross, project manager at Fraunhofer HHI. "After the successful standardization of HEVC, we at Fraunhofer HHI went on to develop a highly efficient HEVC live encoder. The encoder is already being used successfully by premium providers such as Sky or Swisscom for 4k live transmissions."

MPEG-OMAF: Better quality for 360-degree videos

Users are also looking for optimum image quality in virtual worlds – for example when they dive into a panoramic video using VR glasses. The image currently offered to viewers in these panoramic videos is usually quite sobering. This is because it is not enough only to show the viewer's current virtual field of view – otherwise, when he turned his head suddenly, he would be staring into darkness. Instead, the virtual world needs to take shape all around the viewer. In short, because so many images need to be transmitted, it is not that easy to ramp up the quality.

Researchers at Fraunhofer HHI, together with partners on the MPEG Standardization Committee, have now developed an efficient transmission standard that, for the first time, allows high-definition 360-degree videos to be transmitted to current mobile end devices. The standard, called "Omnidirectional MediA Format", or OMAF for short, is based on the HEVC video codec and the MPEG-H audio standard and is currently the recommended way of transmitting 360-degree videos. Its operating principle: "We divide the entire 360-degree video into tiles that are encoded independently of one another – that is why we call our technology tile-based streaming", explains Dr. Cornelius Hellge, Head of Multimedia Communications Group at Fraunhofer HHI. "The end device decides which tiles to download in high resolution and which in low resolution. It thus puts the tiles it needs together to form the required image in the optimal resolution." Within the user's field of vision, the image is thus in high resolution; behind him, it is low.

At IBC 2018, the Fraunhofer HHI researchers present the world's first implementation of the new standard in a complete transmission chain – in real-time! The 360-degree videos were captured at the trade fair using the OmniCam-360, which was also developed by Fraunhofer HHI.

ADVANCED VIDEO CODING

The OmniCam-360 comprises eleven cameras whose images can be put together to form a seamless, high-resolution VR360 video without artifacts.
The researchers used the HEVC Live Encoder of Fraunhofer HHI to code the 360-degree video as it was being recorded – in a total of 48 HEVC streams – and transmitted it via OMAF to head-mounted display glasses that visitors could wear to watch the video stream live and in 360 degrees.

FROM MICROPHONE TO SPEAKER – THE MPEG-H AUDIO REAL-TIME CHAIN

MPEG-H Audio is a next generation audio solution which enables broadcasters and content producers to create and distribute attractive programs with immersive audio and interactivity. It allows the carriage of audio in the traditional channel-based format or as objects and in Higher Order Ambisonics. The ability to transmit specific elements of the audio mix as objects offers the user a choice of different languages or the possibility to alter single audio elements in terms of volume and position within the limits defined by the content producers. With its new features, MPEG-H Audio opens up new dimensions for creatives as well as for viewers.

MPEG-H Audio is on air since May 2017 as the sole audio codec of South Korea's new terrestrial UHDTV service and the only next generation audio codec worldwide used in regular broadcast operation. Additionally, a number of end-to-end broadcast trials based on MPEG-H Audio were conducted throughout the summer of 2018. Its operating in Korea and the trials demonstrates that the complete production and transmission chain for the MPEG-H Audio system is already available.

The respective equipment includes MPEGH monitoring units for real-time monitoring and content authoring, support for postproduction, MPEGH Audio real-time broadcast encoders as well as decoders in professional and consumer receivers:

1. Live production

For live content creation dedicated hardware devices are available, such as the "Jünger Audio MMA" or "Linear Acoustic AMS", which are able to generate the

metadata "on the fly" during live broadcasting.

2. Post-production

Several postproduction solutions are available; one of them is the Fraunhofer IIS MPEGH Authoring Tool (MHAT). MHAT gives the opportunity to create MPEGH scenes and the related metadata with existing content in postproduction. The producer can define specific parameters, instantly listen to configuration changes and later export these settings in form of a "control track". The control track is a mono PCM audio signal, which is distributed together with the audio content over SDI ensuring a secure transmission of the content together with the metadata through the broadcast facility to the MPEG-H emission encoder.

3. Encoding and decoding

MPEG-H-enabled broadcast encoders are available from DS Broadcast, Kai Media as well as Pixtree and are used in regular operation in the Korean broadcast services. Most recently, Ericsson introduced its AVP 2000 Contribution Encoder and companion MediaFirst Content Processing Decoder as the industry's first contribution-path encoding/decoding solution with support of MPEG-H Audio. The new Ericsson device enables broadcasters to generate MPEG-H bitstreams with all the necessary metadata at the site of an event and transport it back to the studio for further processing and final emission. Ateme's TITAN UHD Live Broadcast Encoder with MPEG H support has been used in several DVB broadcast trials in Europe including one of the major French tennis tournaments. The encoded signal was successfully transmitted via satellite and DVB-T2 in a live Ultra HD TV broadcast channel. For first successful trials in China, encoders from Kuvision together with Skyworth STBs based on chips from Hisilicon have been used.

4. Consumer experience

MPEG-H-enabled TV sets have been on the market since March 2017 from manufacturers such as Samsung and LG. While the interactive features can be enjoyed on

every device with MPEG-H support – from large UHD TVs to small smartphones – the reproduction of true 3D sound requires additional hardware.
Following the trend towards more c onsumer-friendly solutions instead of a large number of discrete speakers, the first 3D soundbars capable of playing back MPEG-H content are expected to enter the market later this year, including one from the German company Sennheiser, which launched its MPEG-H-enabled soundbar prototype at CES 2018 to rave reviews.

EASYDCP SOFTWARE SUITE
SEVEN MAGIC LETTERS FOR DIGITAL CINEMA

The post-production software easyDCP has secured its place on the market for creation, playback, and quality control of digital cinema packages DCPs and Interoperable Master Packages (IMPs) for ten years now. Its rich functionality is not only available through the easyDCP stand-alone software, but is also integrated into a number of cutting-edge post-production tools. Features like the authoring of IMF packages, Dolby Atmos support, advanced subtitling options, GPU-accelerated real-time playback of IMF packages, GPU-accelerated JPEG 2000 encoding (Windows), advanced scaling features, extended export features, easyDCP software API for IMF integration, and presetting for easy authoring of Netflix packages make it a reliable tool for generating DCPs and IMPs.

Without Detour to Digital Cinema – easyDCP Publisher

The easyDCP Publisher is an all-in-one software solution for the generation and playback of Digital Cinema Packages (DCP) based on the recognized and widespread easyDCP suite. It´s up to the business and workflow model of the post-house if they want to use the elaborated possibilities of an own stand-alone suite or a pay-as-you-go model for only a few movies per year.

"We decided to make easyDCP also available via an on-demand licensing option, as we understand that many clients need reliable authoring software even for a smaller quantity of jobs", says Heiko Sparenberg, Head of the Digital Cinema group at Fraunhofer IIS. "And our considerations did not stop at this point – we then released a version with a data bridge between easyDCP Publisher and Final Cut Pro. Big advantage: this first end-to-end workflow directly from Final Cut Pro X´s

timeline to the easyDCP Publisher ecosystem guarantees users a continuous workflow for DCP creation. The integrated step to the easyDCP Publisher allows an easy way for cinematographers, post-houses, and movie enthusiast to create a standard compatible distribution package for the cinema," explains Sparenberg.

With this seamless transition from Final Cut's editing timeline to easyDCP Publisher, users have the ability to carry out further improvements on the content as often as necessary.

10 years of enabling easy access to the big screen

For almost a century it was sufficient to use a film roll, a projector, and a white wall or sheet of linen to display movie content at any time everywhere in the world. That seemed to be over – when "digital" became the new magic code for cinema at 2000. The intention of the team of Heiko Sparenberg and Siegfried Foessel at Fraunhofer IIS was to keep the fundamental features for -screening movie content – everywhere, anytime, and almost on any cinema device also in the digital age. Together with other film enthusiasts, they struggled hard to specify a worldwide valid format for digital movies. Working on behalf of the Digital Cinema Initiatives for technical specifications and a reliable test plan for digital cinema, they came up with the proposal of creating a unique universal format – the digital cinema package DCP as digital pendant for the film reel.

But – on the way to make digital cinema a common reality – that was only step one. Step two was to create tools, loyal to the DCI (a consortium of the six Major Hollywood Studios) specs, easy to handle so that also non-digital-cinema natives could do a digital movie and play it on a big screen. This was the birth of easyDCP.

"Defining the first version of easyDCP was not easy at all", explains Heiko Sparenberg. "Of course, a software engineer usually finds the self-developed programs easy to use. However, the big question

was whether the end users – who often work under great time pressure – also see it that way. And, there were so many ideas to be implemented in the first version, we were really worried about putting too much into it."
So the most challenging step was then to find the right balance between all-necessary-in and easy-to-handle.

After the release and the great feedback from post-production people, easyDCP became a renowned software suite for the reliable creation and playback of DCPs and for Interoperable Master Packages (IMPs), too. Film festivals like the Berlinale have used it to guarantee screening of all submitted content. Meanwhile, the tools with the brand easyDCP are used in more than 1,800 post-production houses and on every continent.

And the next 10 years start with….

At present, the major challenges lie in a further, fundamental change in the work processes of many customers.
"Our customers already receive the content through the cloud and they have to download, edit, and finally upload them back to cloud storage. It is therefore obvious that processing a movie directly in the cloud makes lengthy work steps superfluous", states Heiko Sparenberg.

easyDCP™

www.easydcp.com

AUDIO FORENSICS: DETECTING FAKES AND QUALITY PROBLEMS

Audio files are frequently manipulated. What's real and what isn't? With technologies from Fraunhofer IDMT in Ilmenau, audio files can be investigated to find out this and more.

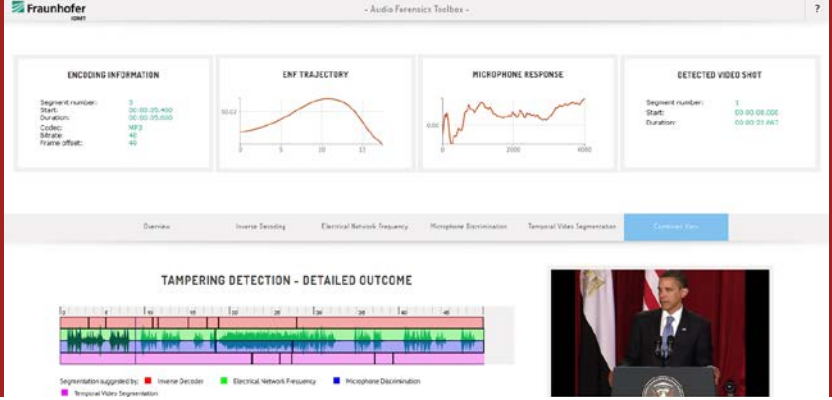
A video recording of an Obama speech. The former president is making statements that don't seem to fit him at all. Did he really say that? My ears can't make out any anomalies, and the video seems to back it up. But, alas, audio files are easy to manipulate. How can I find out whether that recording of Obama's speech is a fake or not? Together with his team at the Fraunhofer Institute for Digital Media Technology IDMT, Patrick Aichroth is developing technologies to detect these kinds of manipulations in audio files.

Mr. Aichroth, how big is the issue of fake news when it comes to audio files?

Audio files can be very easily manipulated using the right kind of editing: we showed that with our video of the Obama speech. In the future, the problem is going to increase drastically. This is because of new software coming on to the market that is able to synthesize speech or imitate the characteristics of the speaker, such as those of a certain politician. Journalists and broadcasters are faced with considerable challenges, as is, say, the police.

Your technology can unmask manipulated audio files? How does it do that?

That aim is to detect the processing steps that have been applied to the audio file in three main areas: recording, coding, and editing. For example – does the audio file come from a certain device? We can use microphone classification to investigate that. Traces of coding, on the other hand, can be analyzed in order to carry out quality control. Has a certain audio file been



coded and, if yes, at what bit rate? Our real specialty, however, is in the area of editing: was something cut out of or added to an audio file and, if yes, where? This third area covers both deliberate manipulation – such as creating fakes – and unintentional problems such as lost cutting lists.

How does your software recognize a manipulated audio file?

In principle, there are two ways: One is via authentication, where digital signatures are used to check whether content has remained unchanged in comparison to a reference state, e.g. the recording. However, this functionality needs to be provided by all recording devices and software within the processing chain. This happens only in very few cases, and that is why most often, we have to rely on falsification-based approaches. This means that we try to show that certain statements about the recording cannot be true. Of course, this requires a readiness on the part of the provider to document as much as possible about the context and the conditions of a recording. We can then use our tools to check the statements in question. For example, our software can detect how the individual parts of the audio file were previously coded and where they were edited. With a second approach, we can extract traces of the electric network frequency and detect inconsistencies, such as phase jumps, that indicate editing steps. Using yet another approach, we can also detect whether the material is from a certain recording device or not. And in addition to such detection tools, there are algorithms that can support the process: For instance, phylogeny analysis is a particularly useful approach which automatically detects the "genealogy" of audio files. We can use it to answer questions such as: Within a set of transcoded copies, which one was the original audio file? Which duplicates have been derived from it and in what order, e.g. by means of coding?

If you combine the various approaches, you obtain a useful toolkit that can help forensic scientists and journalists to check content, especially user-generated content.

REALISTIC PEOPLE FOR VR WORLDS

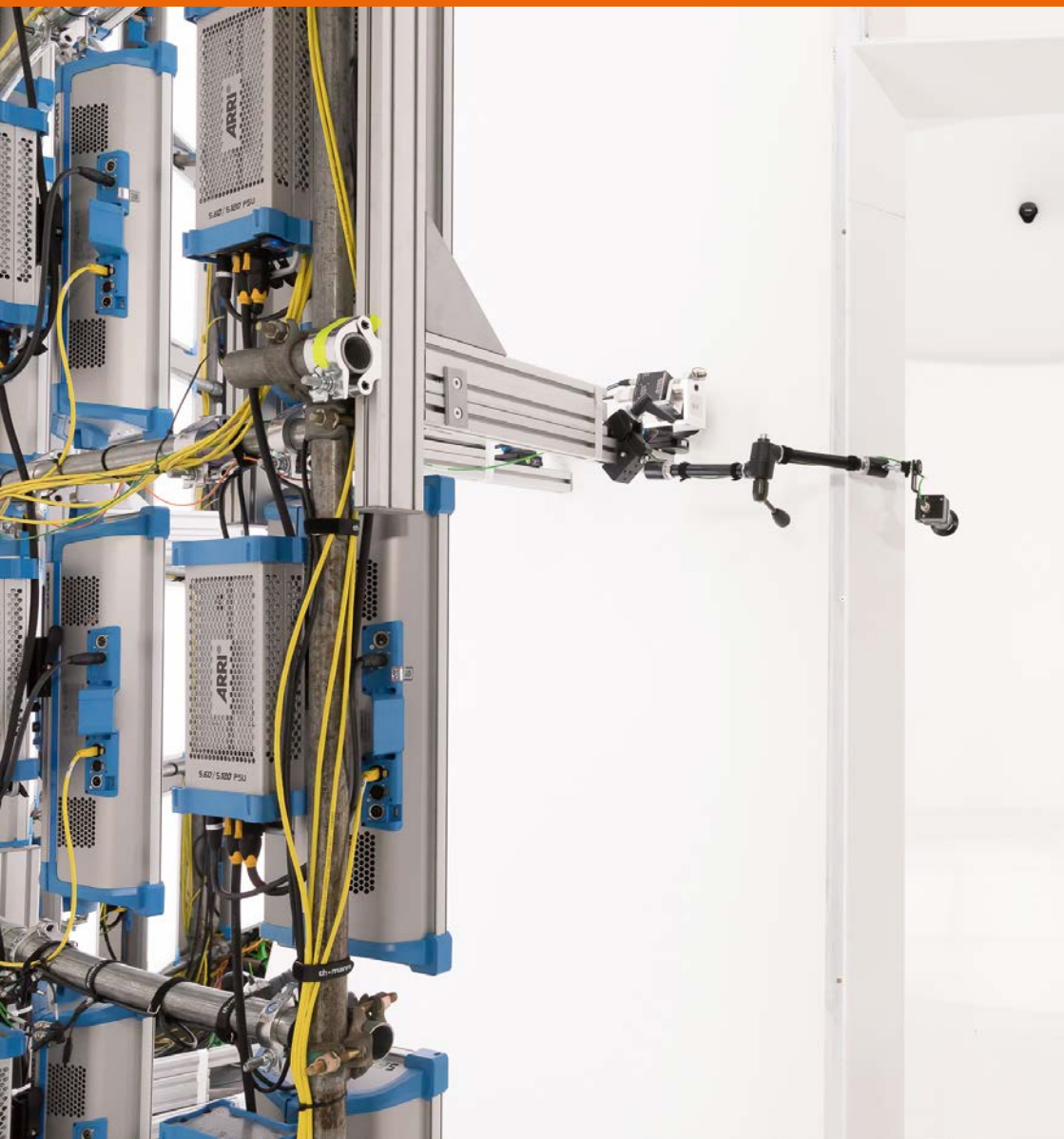
Can people be depicted realistically in virtual environments? Of course! A studio that recently opened near Potsdam's Filmpark Babelsberg, using Fraunhofer HHI's technologies, makes it possible.

VR environments look as realistic as the real world around us – that's something that we're already used to. When it comes to the people, however, there is room for improvement: they still seem to move unnaturally. A new studio system from Fraunhofer HHI now aims to eradicate this problem.

"We film a person using 32 cameras," explains Ingo Feldmann, Head of Immersive Media & Communication Group at Fraunhofer HHI. "Special software creates a depth map from the recordings, and then uses the depth map to create a dynamic 3D model."

The result is that the person being filmed can be placed at will within the VR environment and can be viewed from any angle. This looks as realistic as in the natural world. Unlike in a classic film, in fact, you can even walk around the person.

At Filmpark Babelsberg, researchers from Fraunhofer HHI recently opened the first studio of this kind. External customers can use the studio to have digitization carried or order additional services.
The researchers at Fraunhofer HHI would also like to use the technology in other areas in the future. One possible scenario is that, in the event of a complex operation, an additional expert could connect via VR, see the patient in real time, and offer assistance.


ARRI
ARRI

A PANORAMIC VIEW BEHIND THE SOCCER SCENES

During the recent World Cup, viewers of Greek TV station ERT were able to take their place among the professional players in the catacombs of the stadiums – thanks to 360-degree video.

Look, Thomas Müller is coming out of the changing room! And Boateng is strolling towards his player escort. For die-hard soccer fans, it is amazing to be able to experience their heroes up close – such as in the catacombs of a soccer stadium right before kick-off in a World Cup game.

For the viewers of Greek TV station ERT, this became a reality – or at least that's how it must have felt. In addition to the transmissions of the games, they could watch additional videos via the media library. Some of those videos, such as the ones of the teams before the game starts, are even available as a 360° panoramic view. Viewers can use their own TV remote controls to control the camera perspective and to vary their field of vision however they like – allowing them to experience the stars, referees, and mascots as if they were really standing right beside them.

The 360-degree videos were recorded and provided by FIFA. They can, however, only be viewed on YouTube or with other apps. To begin with, there was no chance of doing so on TV. That is where a technology from Fraunhofer FOKUS comes into play: the technology processes the videos in a way that allows TV viewers to enjoy them in 360 degrees.

"When watching a game with family or friends in front of the TV, you're bound to want to be able to see the bonus material too", says Dr. Stephan Steglich from Fraunhofer FOKUS. "The usage figures underline this: they are highest around the games. Our technology is what makes this possible."

TV station ERT would like to continue using the Fraunhofer technology in the future and to expand its offering of 360-degree videos – for such events as classical or rock concerts. In the long term, the videos are also to be streamed live in the media library.
"Our technology is currently more than capable of doing so," Steglich confirms.

He considers the 360-degree videos on TV to be a logical expansion to normal television formats, but also to VR glasses. This is because VR glasses generally do not remain on a user's nose for more than ten minutes, as the user often feels too cut off from the outside world. On TV, however, he or she can enjoy the panoramic view and the feeling of being right in the middle of the action – all while still being aware of what is happening in the living room.

xHE-AAC EXTENDS NATIVE AAC SUPPORT IN ANDROID PIE FOR BETTER QUALITY AT LOW BIT RATES

Inherently designed for adaptive streaming, xHE-AAC, the latest upgrade to the MPEG AAC codec family, provides reliability of streaming services even under challenging conditions. xHE-AAC is the only perceptual audio codec that covers the entire bit rate spectrum – starting as low as 6 kbit/s for mono and 12 kbit/s for stereo services. Thus xHE-AAC streaming apps and streaming radio players may switch to very low bit rate streams and offer a continuous playback even while the network is congested. Once more bandwidth becomes available on the network again, the xHE-AAC client can request a higher bit rate version and seamlessly switch over the full range of bit rates. Audio bit rate that is being saved due to the improved coding efficiency can be used to improve video quality.

In June 2018 the Android P Developer Preview 3 (Beta 2) was released, later to become Android 9 "Pie". With this release Fraunhofer IIS announced a new version of its popular FDK library which has been a part of Android since 2012. The FDK2 version brings several new technologies to Android OEMs, service providers and developers: xHE-AAC, which extends the usable stereo bit rate range of AAC – from 12 kbit/s up to 500 kbit/s and above, enabling subscription video on demand (SVOD) and streaming music distributors to globally offer a better, more reliable consumer experience over congested networks and particularly in regions where consumers still rely on 2G or 3G connections. In addition, MPEG-D DRC provides mandatory loudness control for xHE-AAC to play back content at a consistent volume and offers new dynamic range control profiles for listening in noisy environments.

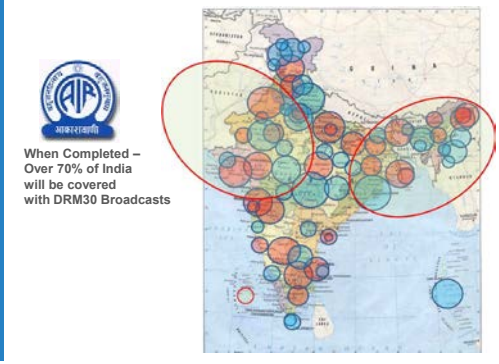
Developers will be able to use the new features immediately in Android Pie, which offers extensions to the existing FDK APIs. The new technologies have been included in the existing, successful AAC patent licensing program administered by VIA Licensing at no additional cost. Professional and consumer software solutions are available from Fraunhofer today.

INDIA'S RADIO BROADCAST DIGITIZATION

India is currently rolling out the largest digital radio deployment worldwide. The national broadcaster All India Radio (AIR) is upgrading the national terrestrial broadcast infrastructure for the future. The broadcast standard of choice is Digital Radio Mondiale (DRM), the universal, open digital broadcasting standard for all coverage needs.

The DRM standard supports both the AM and VHF bands and ensures an efficient and complete digitization of radio in India, no matter if the services are local or regional, nationwide or even international. The transition from legacy analog broadcasts to digital radio is seamless, by upgrading the existing transmitter infrastructure, while at the same time offering analogue-digital simulcast services. Once the transition to all-digital services is finalized, AIR will save up to 80% in energy and maintenance costs.

The first phase of the national launch for digital radio services – upgrading the broadcast infrastructure to be able to transmit DRM-based services – was successfully finalized by AIR in 2017. The second phase is already progressing. It includes final content selection, the addition of Journaline advanced text services, and fine-tuning of the transmissions. Eventually – based on DRM's Emergency Warning Functionality (EWF) – AIR's DRM transmission network will be tightly integrated into the national infrastructure for disaster management and alert dissemination. Once finalized, phase two shall lead to a public information campaign by AIR to its listeners, with the full support of the receiver and automotive industry.



The latter has been equipping new car models with default DRM radio sets for quite some time now – at no extra cost to the customers. By the beginning of May 2018, the estimated number of DRM-enabled cars had already surpassed 800,000. The receiver industry has been working on several new standalone DRM radios for consumers recently, which are set to be available soon.

easyDCP SOFTWARE SUITE

In order to create a DCP (Digital Cinema Package) easily and compliant to all the requirements, or to test such packages subjected to delivery, Fraunhofer IIS developed the easyDCP software suite. More information about easyDCP, which is available as standalone tool-set – as well as plug-ins for various post-production solutions incl. BMDs Resolve – can be found at *www.iis.fraunhofer.de/easydcp*

easyDCP PUBLISHER

The easyDCP Publisher provides a cost-effective solution to generate DCPs with minimal effort and risk for approval and playback on a cinema server. To work with the software, professionals have to simply render, preview and fine-tune content and then the DCP is ready to be published. The project-based solution is available at *www.easydcp.com/publisher.php*

REALCEPTION®

Plug-in for light-field post-production

Realception® tools from Fraunhofer allow for working with light-field or multi-camera data in post-production environment that is familiar to most of the professionals. The plug-in is available on a test user agreement basis.

3D SOUND WITH SPATIALSOUND WAVE

SpatialSound Wave is an object based system for producing and replaying true-to-life three-dimensional sound. It offers sound engineers and other users new options to easily and efficiently produce spatial sound. Application areas are full domes, live sound, entertainment, exhibitions, trade shows, and other events.

FRAUNHOFER DIGITAL MEDIA ALLIANCE

As an one-stop competence center for digital media we provide for our customers scientific know-how and the development of solutions that can be integrated in workflows and optimize process steps.

The members of the Digital Media network are actively working in renowned organizations and bodies like International Standardization Organization ISO, ISDCF (Inter-Society Digital Cinema Forum), SMPTE (Society for Motion Picture and Television Engineers), FKTG (German Society for Broadcast and Motion Picture), and in the EDCF (European Digital Cinema Forum).

Fraunhofer institutes in the Digital Media Alliance jointly offer innovative solutions and products for the transition to the digital movie and media world of tomorrow. The Institutes in the Alliance are available as renowned contacts and partners for all of the digital topics connected to digital media, digital movies, and standardization, as well as new cinematography, audio, and projection technologies, post-production, distribution, and archiving. The goal of the Fraunhofer Digital Media Alliance is to quickly and easily help find the right contacts, partners, and suitable technology.

The Fraunhofer Institute members are

- Digital Media Technologie IDMT, Ilmenau
- Integrated Circuits IIS, Erlangen
- Telecommunications, Heinrich-Hertz-Institut HHI, Berlin
- Open Communication Systems FOKUS, Berlin

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