Fraunhofer
DIGITAL MEDIA

#WHATSNEXT IN DIGITAL MEDIA

TRENDS AND TECHNOLOGIES IN DIGITAL MEDIA

SOLUTIONS THAT CREATE THE FUTURE OF MEDIA

70 YEARS OF
FRAUNHOFER
**70 YEARS
OF FUTURE**
#WHATSNEXT

Issue 9

PREFACE

70 years of Fraunhofer – 30 years of media research – 15 years of alliance digital media … important dates that mark milestones that open up new opportunities and markets – especially for the media industry. mp3, Digital Cinema, Arriflex D20/21, H264, xHe-AAC, easyDCP, OmniCam, MPEG-H and many more are among those well known solutions, standards and systems that embody the Fraunhofer spirit. A spirit that drives us forward as we create new ideas and develop them into market-relevant solutions that enable new workflows and new customer experiences.

#WHATSNEXT in digital media
When it comes to codecs, the most pioneering technologies are real-time workflow solutions for HEVC and MPEG-H – from the stage to the post-production desk, and from 'on air' to our living rooms or on our mobile devices.

Our software-based encoding/decoding JPEG XS SDK is one of the first solutions for media equipment and infrastructures. The JPEG XS standard is specially designed for the requirements of IP-based real-time applications in studio environments and VR/AR applications.

AI-based solutions for audio mining and forensic analysis of media content pave the way for technologies that sooner or later will become indispensable parts of systems capable of handling increasing amounts of data, sifting out the essentials, and securing and facilitating workflows.

Explore new media solutions with us and enjoy reading!

Dr. Siegfried Foessel

Spokesman Fraunhofer Digital Media Alliance

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– Every second bit of the worldwide data traffic can be sent thanks to Fraunhofer technologies.

– mp3, AAC and HE-AAC are today in all consumer electronic devices, PCs and smartphones.

– Nearly 50 percent of the bits transported via the Internet are compressed using the video coding standard H.264/AVC, co-developed by Fraunhofer HHI.

– The Apple and Android ecosystems are based on AAC, for instance music distribution, Facetime, Airplay, or Carplay.

– Half of the world's digital broadcast TV sound and most digital radio systems are enabled by Fraunhofer IIS audio codecs.

– xHE-AAC is natively integrated in Android and standard codec for Digital Radio Mondiale.

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– SpatialSound Wave: First to market in object-based audio.

– MPEG-H Audio is used in Korean UHDTV since May 2017.

– Almost every entertainment device uses audio and video codecs of Fraunhofer.

– The easyDCP software suite for movie content mastering and packaging is one of the most reliable tools in the industry.

– AudioID: Pioneer in audio matching since 2002.

– The 3GPP communication codec EVS is in use worldwide, for example in Europe, USA, China, Japan and South Korea.

– World leading in speech recognition transcribing audio and video files in real time with a vocabulary of over 2 million words, processing any voice/dialect.

JPEG XS – GET IT STARTED!
THE NEW HIGH QUALITY CODEC
FOR VIDEO OVER IP

The era of using dedicated video signals like SDI (Serial Data Interface) is ending, especially in the studio environment. Completely IP-based workflows are one of the major requirements when new broadcasting operation centers are designed. With this prerequisite, a seamless transport of video streams from the OB van and the cloud up to mixing studios and the Network Operations Center will be enabled. Inside the broadcasting operation center, thousands of video signals will be routed and will connect devices like contribution receivers, video mixers, encoders, monitoring displays, and many more.

JPEG XS-SDK made by Fraunhofer IIS

The video coding experts at Fraunhofer IIS introduce and provide a software-based solution to encode/decode high-quality images in the JPEG XS standard. "We are offering a Software Development Kit with optimized functions for encoding and decoding of JPEG XS. This allows system integrators to benefit from our developments and to achieve the highest performance when using it in devices and applications of their own systems", explains Siegfried Foessel.

The Fraunhofer JPEG XS SDK contains an optimized CPU encoder and decoder for Intel and AMD CPUs. The SDK uses multiple possibilities for parallel processing on CPUs from SIMD (Single Instruction Multiple Data) to multi-threading allowing optimal processing on multi-core processors. This enables software-based encoding and decoding of 4k and 8k video streams on server platforms in high-end applications. For monitoring and preview of lower resolutions or sublayers, the JPEG XS decoder can even run on ARM

CPUs like used in the Raspberry Pi 4. In addition, the JPEG XS SDK includes an optimized GPU decoder. Our GPU decoder for Nvidia graphic cards based on CUDA implementation enables decoding of up to 8K video streams.
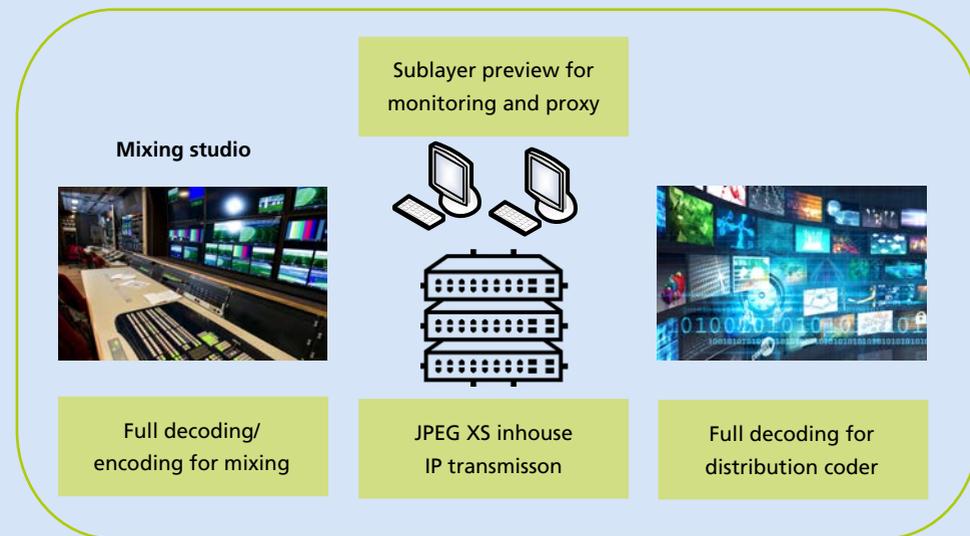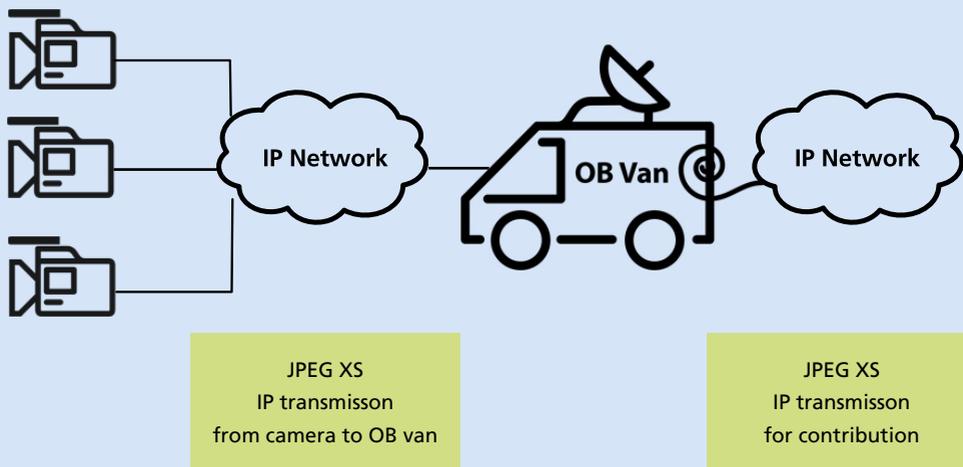
Insights of JPEG XS

JPEG XS is a new codec standardized by ISO/IEC JTC1 SC29 WG1 (the 'JPEG committee') for IP workflows in studio environments, for local video networks, and for VR/AR applications that allows transfer of high-resolution video data over standard Ethernet or other wired connections.

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 the integration of this codec into any interface or

monitor. Other codec families are targeting a higher compression ratio for distributing signals to the end user (distribution codec), but are not optimized for low latency and lowest complexity.

With its wavelet-based coding scheme, smaller sublayers with half or quarter resolution can be extracted without the need to decode the full stream. Easy monitoring of proxies with the lowest number of resources is possible.

The new JPEG XS standard offers an optimized solution for a wide range of applications where only light compression is necessary and requested, but where latency and complexity need to be controlled. The typical compression range is between 2:1 and 12:1. For critical content like mixed screen content or Bayer raw data, the optimal compression range is between 4:1 and 6:1. For natural RGB images, compression ratios up to 12:1 are feasible.

IP Network

OB Van

IP Network

JPEG XS
IP transmisson
from camera to OB van

JPEG XS
IP transmisson
for contribution

Sublayer preview for
monitoring and proxy

Mixing studio

Full decoding/
encoding for mixing

JPEG XS inhouse
IP transmisson

Full decoding for
distribution coder

*Essential criteria for codecs
in Video over IP*

LIVE DECODING OF VVC-ENCODED VIDEOS

Video data is increasing rapidly – the new Versatile Video Coding (VVC) standard is therefore intended to compress it even more effectively than before. HHI researchers are already developing real-time decoding software for VVC.

Do you want to stream an episode of your favorite series? Or see a video that your friends "liked" or sent to you? However you view them: video data is increasing faster than ever before.

The HEVC standard already compresses the data so well that ultra-high resolution 4K television is possible. But demand continues to rise – and in the long term it will exceed HEVC's capabilities.

Researchers at the Fraunhofer Heinrich-Hertz-Institut HHI are therefore developing an HEVC successor together with renowned electronics manufacturers and other scientific institutions: the new Versatile Video Coding standard, or VVC for short. The aim is that the images

should have the same perceived quality while the necessary bit rate is also reduced by 50 percent. "Significant parts of the technology were researched and developed in our institute," says Benjamin Bross, project manager at Fraunhofer HHI. The new standard is expected to be ready by July 2020.

Decoding content in real time
However, the researchers at Fraunhofer HHI are already thinking ahead: "We are working on a decoder that is able to decode the VVC-encoded content on a conventional PC using software and in real-time – i.e. Live," says Bross. "This means that as soon as the new standard is ready, we can supply the necessary software to play content live."

Real-time decoding is by no means a matter of course: The decoder used by the research team to develop the standard takes several minutes to decode ten seconds of video footage. The HHI decoder, on the other hand, will only take ten seconds – no longer than the video runtime itself. It will be used primarily in pilot projects for which it can be installed as software on laptops.

Because, as Bross knows, "once the VVC standard is ready, we will need the right infrastructure and an appropriate ecosystem to set up the new applications." Experience has shown that after the standard has been completed there will be about two to three years until the end user can enjoy VVC-encoded content.

Then, according to Bross, appropriate decoding units will also be installed as standard in the then-current smartphone and tablet versions.

WHAT RADIO LISTENERS WANT

Personalized radio or TV content? In order to achieve this, it is important to find out the particular wishes of the respective user. An innovative tool can combine the advantages of the existing approaches.

If you browse through the offerings of online stores, you will read the following note: "You may also be interested in these products...".
With this kind of recommendation, online sellers want to keep customers interested and tailor their offering to their interests and needs. Radio and television stations would also like to respond to the individual wishes of their listeners and viewers and need the right recommendation tools.

Both content and usage analysis are suitable as a basis for such recommendations: Via automatic analysis and metadata, providers know which content is contained within individual broadcast segments – and can thus offer users content similar to that which they have called up so far. "Collaborative filtering," as it is known, is an alternative to that: Usage data is used to determine relations between users or items, and to draw conclusions about possible wishes of the current user from that. Both methods have their advantages and disadvantages.

While content analysis allows recommendations across different domains and media types – i.e. image, text, audio, video, usage analysis enables system to better react dynamically to the actual usage. Researchers from Fraunhofer IDMT are combining both methods in so-called hybrid recommendation approaches, thus combining the advantages of both approaches. This has already been tested in an initial scenario. "Authors were supposed to be able to write text contributions for a web portal while making optimal use of existing audio and video material that makes the content more interesting," reports Patrick Aichroth, group manager at Fraunhofer IDMT. "For the authors, however, it was a tedious task to find the appropriate audio and video files. Our hybrid recommendation now allows that to happen automatically."

For methods like this, data protection plays an important role.

This is where a patented protocol developed by Fraunhofer IDMT comes in, which strongly decouples real identities from user pseudonyms: In this way, data analyses and personalization and recommendation services can be realized with a pseudonym that demonstrably corresponds to a real identity. However, the real user can no longer be identified from this pseudonym – even if the data is lost.

MPEG-H AUDIO-ENABLED SENNHEISER AMBEO SOUNDBAR POWERED BY FRAUNHOFER UPHEAR

The AMBEO Soundbar from German manufacturer Sennheiser is now available to consumers.
Sennheiser and Fraunhofer jointly developed the built-in virtualization technology based on Sennheiser's AMBEO- and Fraunhofer's upHear technologies, to create an immersive audio experience at home.

Fraunhofer IIS' upHear Immersive Audio Virtualizer post-processing technology enables consumer devices such as sound-bars and TVs to create a convincing immersive 3D audio experience from any input source – without the need for advanced loudspeaker setups. What's more, Fraunhofer upHear facilitates 3D audio soundbar designs that do not require satellite surround speakers or a subwoofer.

Thanks to the combination of the AMBEO technology and the upHear algo-rithm, as well as the technology's room calibration feature that enables use of the room's properties, the Sennheiser AMBEO Soundbar is able to deliver immersive 5.1+4H sound. Speaking of which: the soundbar is compatible with MPEG-H Audio and the inherent upmix technology can turn a 5.1 surround movie soundtrack or even stereo music into a highly immersive sound experience.

MPEG-H Audio provides immersive sound and enables the viewer to personalize a program's audio mix, for instance by switching between different languages, adjusting the volume of a sports com-mentator, enhancing the dialogue, or choosing from various audio description options. MPEG-H Audio is specified in the ATSC 3.0, DVB and 3GPP standards.

In South Korea, terrestrial ATSC 3.0 broadcasting with MPEG-H Audio is al-ready on air, making MPEG-H the world's first commercialized Next Generation Audio technology. It has also been successfully tested in many European countries where digital television systems are based on Digital Video Broadcasting. Other attractive sources of MPEG-H content are immersive music and video streaming services such as those announced at CES 2019 in Las Vegas.

RADIO STATIONS:
ANALYZED TO THE TINIEST DETAIL

Everyone would like to be unique – and radio stations are no exception. Automatic program analysis tools from Fraunhofer IDMT will now allow "uniqueness" estimates to be made.

How often does a radio station repeat its content? To what extent does it differ from other stations? Are there stations with news dominance, i. e. channels that usually report news first? These are the kinds of questions radio stations would like to answer for themselves in order to optimize their content accordingly.

Broadcasters are now able to answer these questions using the program analysis tools developed by researchers at the Fraunhofer Institute for Digital Media Technology IDMT.
"Our station analysis uses 'partial matching' to find any repetitions in the program – this can be the station's jingle as well as news reports, commercials, or music tracks," explains Patrick Aichroth, group manager at Fraunhofer IDMT. „On the basis of such repetitions and their temporal arrangement, one can infer the content type and make comparisons with other stations. This gives us a good assessment of the composition and uniqueness of the station."

Other analysis tools from Fraunhofer IDMT are also used for this purpose, such as music analysis and speech and music detection, which provide further details about the content. This might include, for example, musical characteristics such as the genre or tempo of the music used or information about which news items appear with which delay and which changes at different stations.

Simplifying production processes for TV and radio
The tool can also provide good support for production processes in which material is reused. During production, information about which raw material was used for a production is often inaccurate or missing. With partial matching, such information can be created automatically: it compares production and original material and determines which parts overlap. The result is an exact list of which raw material was used at which point of the production, down to the precise location. The tool is also suitable for optimizing storage space: It can be used to track down partial duplicates and, if necessary, mark them for deletion – because it is usually sufficient to keep the original.

TV AND RADIO ARCHIVES SEARCHED IN A FLASH

Need to find a specific original quote in the radio or television archive? Until now, this has been difficult. A new smart Fraunhofer speech technology transcribes every broadcast and delivers the desired broadcasts and time codes in mere seconds when someone needs to find both speakers and keywords.

Where and when did Angela Merkel utter her now-famous words concerning the refugee crisis "Wir schaffen das" ("We can do it")? Finding these and similar original recordings from radio or video is a tedious business for journalists and editors: it is estimated that only ten percent of broadcasters' archive material includes detailed, manually inserted annotations, and only where the archivist considered them important at the time. In the case of all other materials one has only the title information, which permits little conclusion on the specific contents.

Find the right original sound clip in just one click …

The Fraunhofer IAIS Audio Mining tool makes this procedure much easier. "If a radio or television recording is archived, our tool uses deep learning to transcribe any spoken language into a text," explains Dr. Christoph Schmidt, Head of Business Unit "Speech Technologies" at Fraunhofer IAIS.
"Every broadcast is thus available as a text file in which individual search terms can be found in fractions of a second. For each word, the time markers are also stored in the broadcast – so you can mark the desired position in the text and
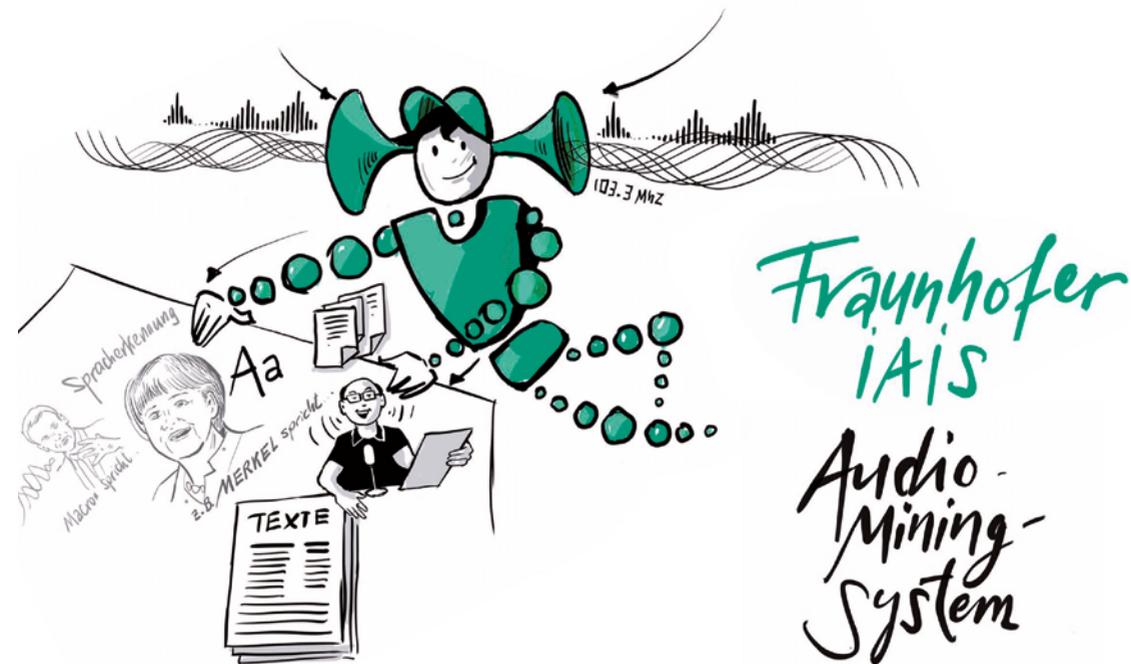
cut out the audio snippet you are looking for."

For the editors this means that if, for example, they are searching for the original sound clip of Merkel's statement, they can enter the right words in the search field of the user screen and receive a list of all broadcasts including the exact time in which this Merkel excerpt can be heard.

The tool automatically segments broadcasts according to the speaking persons; the researchers call this "speaker clustering." Here, the persons speaking in a broadcast are numbered consecutively – if you have listened briefly to which speaker belongs to which digit, you can choose only to listen to the answers of the person being interviewed, for example. With the speaker recognition function, the scientists even go one step further: the system recognizes the exact speaker, for example a certain politician. It is therefore able to answer more complex queries such as: "Merkel's statements on the nuclear phase-out" – or can jump to the contribution of a specific

person in a talkshow with a click. This involves teaching the computer how different people sound. With speech snippets of one to two seconds this is still quite difficult, but given a talk time of 30 seconds, speaker recognition already works very reliably. "This is a great way to search through huge archives," says Schmidt.

A second usage scenario involves interviews or other recordings that are directly transcribed live as this facilitates the production of programs.
The Fraunhofer IAIS system for accessible subtitling is already in use at the Saxon state parliament; other state parliaments have already shown interest. This has also shown that the system is robust against dialectal language. In the medium term, it is also conceivable that the tool could be used in real time for automatic subtitling of television or video programs. While this already works quite well for the news, for speakers with strong dialects or accents, or for rare technical terms – such as those used in

astrophysics – some research work is necessary to reliably recognize all words.

Already in use at ARD
The Fraunhofer IAIS Audio Mining tool analyzes 2000 hours of audio and video material daily for Germany's ARD public broadcasting stations. The system is currently mainly used in the context of archives. "It is conceivable that, in the medium term, stations will not only use it for their archives, but also for their media libraries and automatic subtitling and for working with raw material in the editorial offices," Schmidt explains.

The Fraunhofer IAIS team is currently researching the advancement of speech technologies such as these in the direction of dialog systems.

The system should soon be able to answer spoken questions – as a kind of intelligent assistant for radio and television.
Then, for example, you could ask broadcasters' media libraries questions such as "What do politicians from the Green Party say about the nuclear phase-out?" and you would get clips from various broadcasts where Green Party politicians gave their views on this issue.

*Volumetric video studio
in Babelsberg*

REALISTIC PEOPLE FOR VR WORLDS

Virtual worlds often seem realistic – but the artificial people who move in them usually appear unnatural. A novel technology already allows us to integrate lifelike persons into virtual worlds. The german evening news show Tagesschau is already using it.

What might it feel like to immerse yourself in the movie scene and let your gaze wander where you like instead of just looking at the two-dimensional screen? "Walk-in" movies make this possible. With VR glasses on his or her nose, the viewer can roam the film scenes, circle around the actors, or stand right next to them. But unfortunately people in VR worlds still appear artificial, their movements unnatural.

Lifelike people in artificial worlds
A new technology – developed by the Fraunhofer Heinrich Hertz Institute HHI – can solve this problem. It allows real people who appear lifelike and move in the artificial world just as smoothly and naturally as real people to be integrated into

the VR environment. The trick: The researchers film the actors with several cameras, determine the corresponding depth information, and fuse the data. The result is a lifelike three-dimensional image of the person, including their facial expressions and gestures that can be integrated directly into the virtual world and then rendered for any angle. Volucap GmbH – an operating company founded by Fraunhofer HHI, ARRI, Studio Babelsberg, Interlake, and UFA – is responsible for marketing. "In the summer of 2018, we set up a studio on the premises of the film studio in Babelsberg, more precisely in the FX Center, and are thus one of only a handful of providers worldwide who integrate people of such high quality into VR," says Sven Bliedung,

CEO of Volucap. "Customers have volumetric recordings of people made there, thus creating a digital image of the person in question – the numerous production tests have been completed since November and ongoing operation at the studio has commenced.

Users: News program Tagesschau and the band Die Fantastischen Vier
The Tagesschau team recently used the technology to fade in their well-known newscaster Linda Zervakis as a virtual, three-dimensional person in the studio – the viewer can enter into direct "conversation" with Zervakis. The band Die Fantastischen Vier, nicknamed "Fanta4," has already placed its trust in the new development: on the occasion of their 30th anniversary, they realized an interactive VR experience with the producers Radar Media and gebrueder Beetz filmproduktion. An experience that sends the fans on a journey through the band's history as well as through music videos and live performances of the band in VR. The

viewer, for example, catches a ball on the beach during the "Tag am Meer" video: one of the musicians throws it to the viewer, who is then on the next level – in another scene. Volumetric video and hand tracking are skillfully used, together with the input of Fanta4. Both VR experiences were premiered at IFA 2019.

WITH easyDCP, YOU'RE ALWAYS ON THE RIGHT TRACK AND FULLY EQUIPPED

For over ten years, easyDCP has provided reliability and performance whenever you need to create a Digital Cinema Package (DCP) or Interoperable Master Package (IMF). The software suite comes with creator software, a player for quality control and real-time playback, as well as validation of DCPs and IMFs.

The digital cinema team of Fraunhofer IIS developed the test plan for the digital cinema specifications on behalf of the DCI initiatives in 2007; since then, easyDCP has achieved acclaim and success among post production studios, festivals and independent filmmakers around the world. More than 1,800 companies rely on the standard compliant, easy-to-use and reliable software suite.

Thanks to its reliability, the easyDCP software suite – developed and extended by Heiko Sparenberg and his team to suit the needs and requirements of the media industry – has solidified its position, embodying a spirit that is always a step beyond current solutions.

At first glance, Fraunhofer scientists and engineers work on defining new standards and developing solutions for the industry. However, at Fraunhofer we do not stop at standard or lab solutions. We drive forward the digitization of cinema and upcoming new experiences like 3D, VR/AR and streaming media. In addition, we accept the industry's challenge to deliver practical and reliable software solutions so as to enable the user to apply these new formats and solutions right away in their daily workflows.

Since the early days of easyDCP development, we have also cared about the needs, requirements and ideas of our customer and user community. Our strong

and valuable connection to them helped us to be open to new developments and to provide new features.

easyDCP stand-alone products

In 2008 we launched our flagship solutions, the easyDCP Creator and Player, as a software suite. Most of our first customers still use these stand-alone solutions, but have upgraded them to the new versions.

With version 3.6, we again saw a boost in acceptance on the market. The stand-alone versions excel with a broader range of possibilities like Dolby Vision packaging and playback, integrated versioning capabilities (authoring of supplemental packages), advanced subtitling options including TTML rendering, timeline integration for easy editing, as well as expert DCP/IMF validation and Photon IMF validation.

easyDCP as plug-in

In addition, Fraunhofer IIS made easyDCP accessible to users and post production

companies that work with additional tools for color grading, mastering, etc. With a network of post-production software suppliers and manufacturers, we have developed plug-in offerings and bridges for various applications including Blackmagic Design DaVinci Resolve, SAM Pablo Rio, Apple Final Cut Pro X, and most recently for the Autodesk Flame Family. The plug-ins aim at seamless integration into existing workflow solutions to create DCPs and IMFs right out of the timeline or as an export function.

Recent developments

With deliveries for entertainment services constantly on the rise and demand for time- and cost-efficient workflows, the industry is clamoring for an easy-access tool to help in creating IMFs.
The easyDCP software suite by Fraunhofer IIS now provides the processing of IMFs – the universal and SMPTE-compliant format for high-quality exchange of content during the contribution process – as an export function within Autodesk Flame finishing and color grading software.
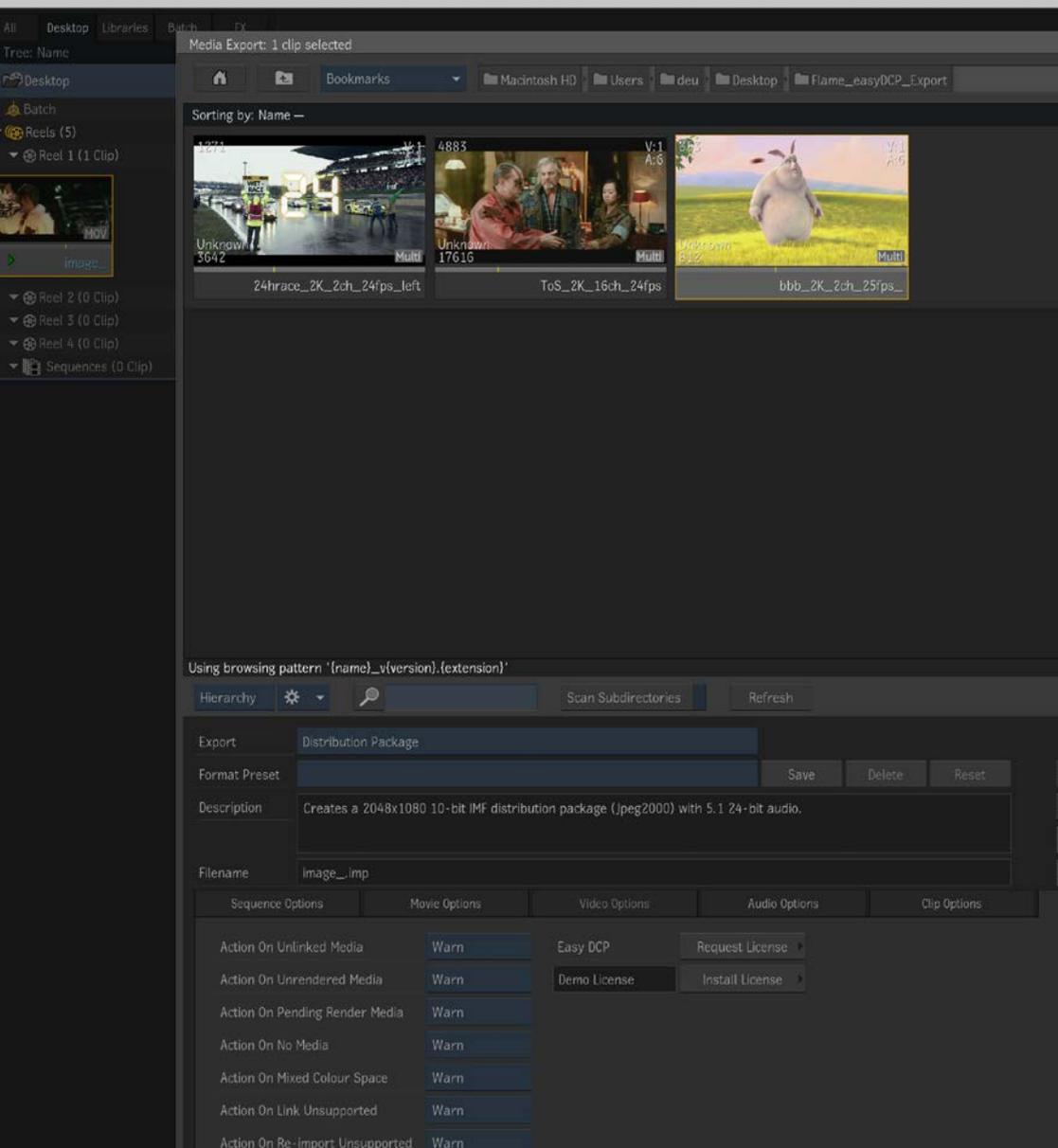
"We are sure that with the high demand of content deliveries for streaming media, the demand for approved tools for creation and playback of IMFs will increase," explains Heiko Sparenberg. easyDCP Player and Creator are also among the approved software solutions in the Netflix Post Technology Alliance.

IMF creation via
Fraunhofer easyDCP plug-in

Version 3.7 – New features

– Sign language integration

– ProRes IMF

– Support for IMF segments
  and marker

– Final Cut Pro bridge for
  stand-alone tools

# ADVERTISING TAILORED TO THE AUDIENCE – EVEN ON TV

Classic broadcasting meets the Internet: With a new technology, advertising on television can now also be adapted to the current group of viewers.

As far as television is concerned, all viewers of a channel see the same advertisement – which one they see is determined weeks in advance. On the Internet, things are completely different. Here, the browser knows which things the user is interested in and spontaneously selects advertising individually tailored to the user's interests according to the advertiser's specifications.

These two worlds are now moving a little closer together: this is thanks to the innovative technology Playout Side AD Insertion, PSAI for short, from Fraunhofer FOKUS. "With PSAI, TV stations can dynamically insert advertisements into their running shows based on real-time audience data," says Dr. Stefan Arbanowski,

department head at Fraunhofer FOKUS. This means that the viewers in front of the screen still see the same advertisements as before, but it is flexibly tailored to the current crowd of spectators. If a lot of sports fans are currently sitting in front of the television, various sports advertisements are automatically broadcast. If, on the other hand, nature lovers are watching, dog food advertisements and spots for outdoor equipment are more likely to run instead.

The necessary information about the current viewers is determined by a tracking system that uses the TV sets' HbbTV function.
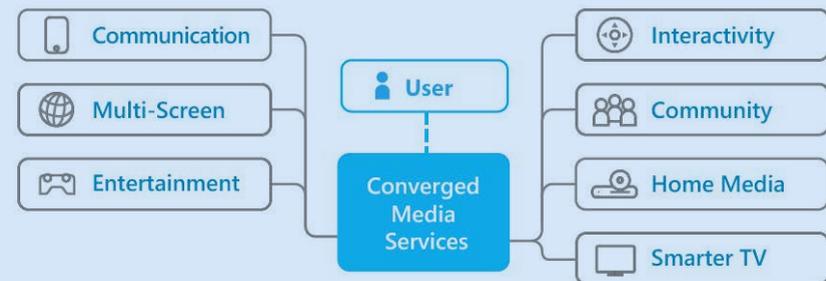
Classic broadcasting meets the Internet:
Playout Side AD Insertion Technology

PERFECT ON-BOARD ACOUSTICS

The cruise ships Mein Schiff 1 and Mein Schiff 2 have a new attraction: Whether passengers are looking for entertainment or a feel-good atmosphere, the 3D sound system SpatialSound Wave offers the optimum acoustics.

If one stands in the harbor and looks at a cruise ship lying at anchor, one is almost overwhelmed by the dimensions – and can feel as small as an ant next to the huge vessel. After all, a floating city like this accommodates thousands of passengers as well as housing pools, restaurants, spas, and the like on different decks. These provide entertainment on sea days. The passengers on the Mein Schiff 1, which sails for the travel agency TUI, have also been able to enjoy a new highlight since spring 2018: the stage.

The stages captivates its audience with perfect acoustics – no matter whether it is showcasing classical string music, spoken-word theater, or an action film. In addition, visitors can experience three-dimensional audio impressions moving through the room: If, for example, a motorcycle whizzes by, the spectators hear it coming from one side, drive past them, and disappear again on the other side.

Under normal circumstances, the work required to set up such optimum acoustics would have been too difficult. Various sound systems and more than 50 loud-speakers would have had to be installed. After all, chamber music requires completely different acoustics from a thriller that flickers across the screen. The SpatialSound Wave 3D sound system from the Fraunhofer Institute for Digital Media Technology IDMT, however, makes it possible to get by with just one sound system and loudspeaker system – and still be able to adjust to completely different acoustics.

"We can, for example, lengthen the reverberation and create the acoustic impression of a large concert hall. Stunning three-dimensional audio impressions can also be easily created interactively," says Christoph Sladeczek, group manager at Fraunhofer IDMT.

Torsten Hirche, technical director and sound designer at TUI Cruises, is very enthusiastic: "What impresses me most is that the sound sounds so convincingly natural. It doesn't matter where I'm sitting, it always feels like the right perspective."

Since May 2019, the system has also been installed on board the sister ship, the Mein Schiff 2 – and in the "Grosse Freiheit" restaurant area.
Here, different theme restaurants are located side by side with different levels of music, separated only by design elements.

The innovative sound system lengthens reverberations while making the room seem larger acoustically – the sound is distributed better.
In short, the sound creates a feel-good atmosphere.

PERSONALITIES / PRIZES

Dr. Siegfried Foessel is heading the technology study program at the HFF

Dr. Siegfried Foessel, Head of the Moving Image Technologies Department at the Fraunhofer Institute for Integrated Circuits IIS, has been the new Head of the Technology Department at the University of Television and Film (HFF) in Munich since October 2018. Together with Prof. Peter C. Slansky, who holds the chair, he drives the new developments part-time for the HFF Munich. Foessel is an important interface between the HFF Munich and practical applications – this is not only important for teaching, but also for the later professional life of the students.

Prof. Wiegand appointed member of the Leopoldina

The Executive Committee of the Leopoldina has appointed Prof. Dr.-Ing. Thomas Wiegand, Professor of Media Technology at the TU Berlin and Director of the Fraunhofer Heinrich-Hertz-Institut HHI, as a member. He has thus received one of the highest scientific awards awarded by a German institution. Membership comes with the honor of belonging to a time-honored scholarly society and of being able to participate actively in various activities. Wiegand will be involved in the Information Sciences section in the future.

Fraunhofer Award for Human Body Reconstruction

Virtual worlds already look very realistic. But the people you see in them generally don't: They seem artificial, their movements jerky.
Ingo Feldmann, Dr. Oliver Schreer, and Peter Kauff of the Fraunhofer Heinrich-Hertz-Institut HHI have now solved this shortcoming: With the technology developed by them, virtual people can be inserted into VR worlds who appear lifelike and move in the artificial world just as fluidly and naturally as people do in the real world. For this, the researchers were awarded the Joseph von Fraunhofer Prize.

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
– Guest: Intelligent Analysis and Information Systems IAIS, St. Augustin

Contact
Fraunhofer Digital Media Alliance
Angela Raguse M.A.
Phone +49 9131 776-5105
alliance-dc@iis.fraunhofer.de
www.digitalmedia.fraunhofer.de