

# Cinema goes digital

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The future of cinema is digital: At the International Broadcast Convention IBC in Amsterdam (September 9 to 13, 2005), the Fraunhofer Digital Cinema Network will be presenting the latest developments in the field of Digital Cinema.

Cinema without film reels - only a vision? Not at all. Before too long, movie theaters will be showing the latest box-office hits from a computer hard disk, rather than playing reels of 35-mm film. Hollywood has taken on a leading role in the transition to digital technology. A new standard for Digital Cinema has already been agreed upon by the major studios Disney, Fox, Paramount, Sony Pictures Entertainment, Universal and Warner Bros., all members of Digital Cinema Initiatives (DCI). To extend this trend throughout the cinema production and distribution chain, the Fraunhofer Digital Cinema Network is developing solutions for all key components - from cameras to projectors - thus creating complete systems for a smoothly organized digital workflow. The research teams will be presenting their latest projects at the IBC.

## **Megacine – the all-in-one recording and storage device**

Digital film production generates huge quantities of data - just one minute of digital film represents 40 gigabytes of data. To store this material, researchers at the Fraunhofer Institute for Integrated Circuits IIS in Erlangen have developed a compact recording and storage device - the Megacine field recorder. It is capable of recording video sequences in the new 2k-Digital Cinema (DC) format, or in high-definition (HD) or standard definition (SD) TV. It has a storage capacity of 1 terabyte (1 terabyte = 1,000,000 megabytes), enabling it to record up to 60 minutes

of uncompressed data in DC quality or up to 8 hours of SDTV footage. Megacine also allows the recorded images to be previewed, enabling the director to view the last take without leaving the set. An integrated digital display provides additional information such as time code, number of frames, elapsed recording time, occupied memory capacity, etc.

### **Digital Dome**

Projecting digital films on a curved surface has never been an easy exercise. The computer has to compile the sequence of scenes using an editing program and compute the entire video data so as to adapt the images to the curvature of the projection screen. Any change in the position of the projector or the structure of the projection screen calls for new re-adjustments or yet another re-computation of the video data. The Fraunhofer Institute for Computer Architecture and Software Technology FIRST in Berlin has developed a more elegant solution for digital dome projection. Using standard projectors and standard PCs, it is capable of showing digital pictures and videos on a half-globe or dome. The images are distortion corrected in real time and adapted to the real physical conditions in the dome. There is no need for time-consuming adjustments. An easy-to-use show player allows different media to be used without having to compute the entire video prior to each show. The dome video has a resolution of 3072 x 3072 pixel.

### **Smooth Motion**

Digital Cinema places special emphasis on high quality. The transition from analog to digital technology is also expected to put an end to jerky frame movements in rapid-motion scenes. Researchers at the Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut, HHI in Berlin have developed a system of smooth motion playback. Cinema films are recorded at a speed of 24 frames per second. This is too slow to capture high-speed action such as a shot on goal in a soccer match. The ball that was at the bottom left corner of one frame would be seen in the top right

corner of the following frame. The smooth motion playback generates an additional frame showing the ball in an intermediate position. The viewer sees a smoothly flowing movement, without any jerky effect.

### **WorldScreen**

In the EU-project WorldScreen, coordinated by the IIS, the Fraunhofer HHI and IIS together with industrial partners are working on new solutions for Digital Cinema. The subject of their development work and studies is the use of scalable data formats in systems that will enable a smooth Digital Cinema workflow. A presentation of some initial results of the EU-sponsored project will be given at the Fraunhofer stand at the IBC on Sunday, September 11, at 4:30 p.m.

Further information can be found at [www.worldscreen.org](http://www.worldscreen.org) and [www.dcinema.fraunhofer.de](http://www.dcinema.fraunhofer.de)

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