

# 3.2

.CONVENIENCE

Text **Sasa Ignjatovic**

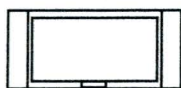
# working on the edge

Swiss born Roger Zimmermann works at the University of Southern California on a broadband-technology, which can change our entertainment environment

## KURZFASSUNG

Der Artikel in 6 Sekunden

The home entertainment market in the US is booming. New technologies like **Remote Media Immersion** carry the home entertainment theatre to new dimensions.



## LINKS

Details about **Internet research** at the University of Southern California, Los Angeles

➤ <http://idefix.usc.edu>

➤ <http://imsc.usc.edu/rmi/index.html>

➤ [http://dmrl.usc.edu/project\\_rmi.html](http://dmrl.usc.edu/project_rmi.html)

## REMOTE MEDIA IMMERSION

➤ **RMI.** Internet technology for capturing, streaming, and rendering high-resolution, digital video and multi-channel audio. RMI uses a commercial high-speed Internet link to transmit multiple streams of picture and sound across the US from an IMSC media server that delivers on-demand video and multi-channel audio content, which surpasses the quality of broadcast television.

**Roger Zimmermann, 41**, born in Tägerig, Kanton Aargau, Switzerland. He is currently the Research Area Director for Media Immersion Environments at IMSC (Integrated Media Systems Center) at the University of Southern California, Los Angeles. This is the US National Science Foundation's Exclusive Engineering Research Center for multimedia and Internet research. The Media Immersion Environments (MIE) concepts have led to the development of the Remote Media Immersion (RMI) system.

### .copy: Mr. Zimmermann what is your work about?

ROGER ZIMMERMANN: My research activities focus on Streaming Media Architectures, web services and database integration. My work on streaming media during the past several years has resulted in the design and implementation of a second-generation streaming system called Yima. Designed on scalable cluster architecture, it also complies with industry standards in content format and communication protocols (RTP/RTSP). Yima is the streaming engine of the Remote Media Immersion (RMI) project, which has been publicly demonstrated on several occasions. I am also interested in and actively investigating and designing peer-to-peer streaming architectures and video sensor networks. My other research interest in the area of web services and database integration focuses on a collaborative project aimed at providing solutions for the collection, exchange and utilization of geotechnical information.

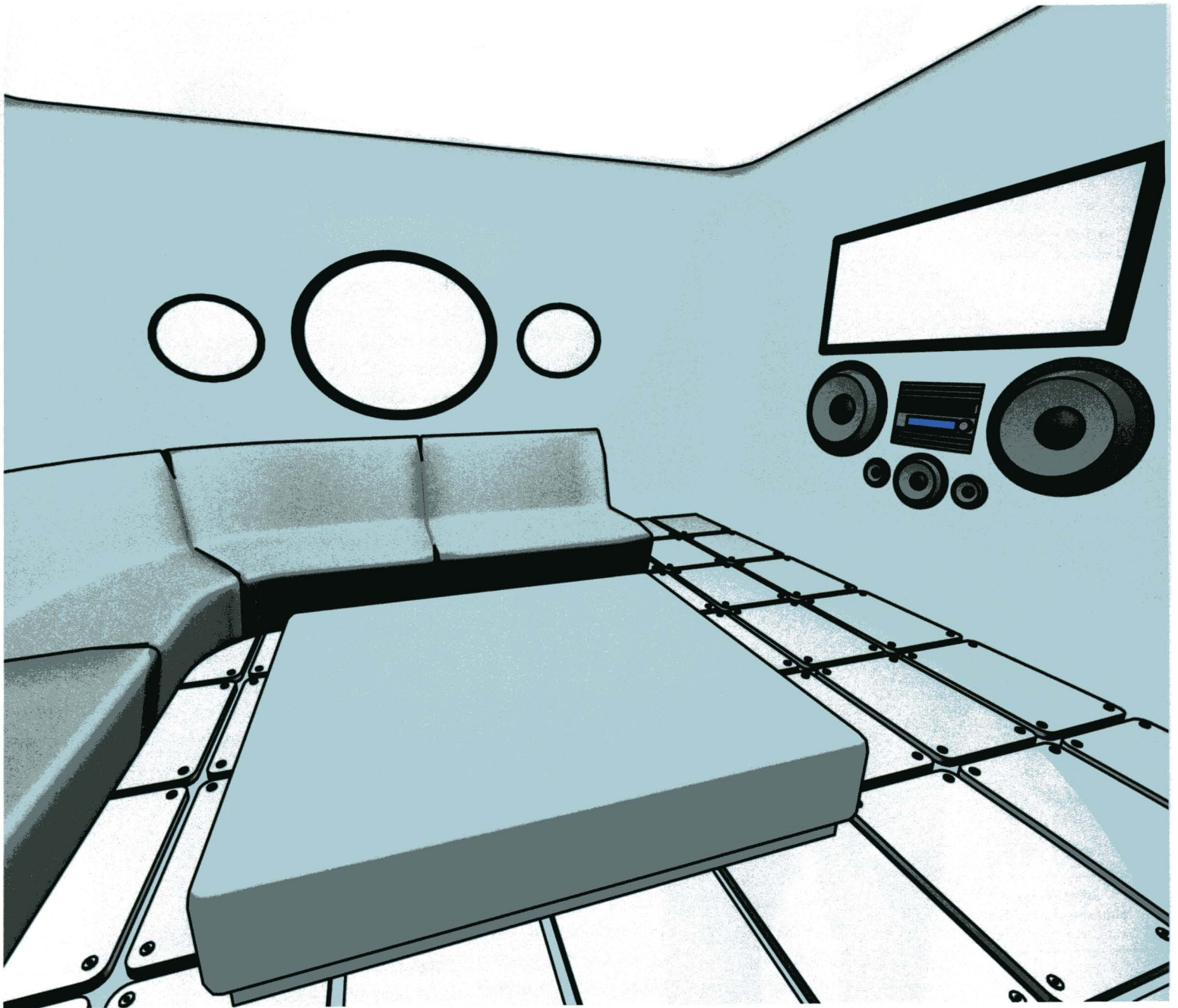
### Could you explain the RMI system?

The Remote Media Immersion (RMI) system is the result of a unique blend of multiple cutting-edge media technologies to create the ultimate digital media delivery platform. The goal of the RMI is to create and develop a complete aural and visual immersive environment of the highest quality that places a participant or group of participants in a virtual space where they can experience events that occurred in different

physical locations. RMI encompasses all end-to-end aspects from media acquisition, storage, transmission up to their final rendering. Specifically, the Yima streaming media server delivers multiple high bandwidth streams, transmission error and flow control protocols ensure data integrity, and high-definition video combined with immersive audio provide highest quality rendering. The RMI system is operational and has been successfully demonstrated in small and large venues. Relying on the continued advances in electronics integration and residential broadband improvement, RMI demonstrates the future of on-demand home entertainment.

### Can you describe the RMI architecture in particular?

The RMI system is based on three major technical components that are together responsible for the storage, transmission, and rendering of high quality media. First, the Yima streaming media architecture provides real-time storage, retrieval and transmission capabilities. The Yima server is based on a scalable cluster design. The server software manages the storage and network resources to provide real-time service to the multiple clients that are requesting media streams. Media types include, but are not limited to, MPEG-2 at NTSC and HDTV resolutions, multi-channel audio (e.g., 10.2 channel immersive audio), and MPEG-4. Second, a selective data retransmission scheme improves playback quality while maintaining real-time properties. A flow control component reduces network traffic variability and enables streams of various characteristics to be synchronized at the rendering location. RMI uses the industry standard networking protocols Real-Time Protocol (RTP) and Real-Time Streaming Protocol (RTSP). And third, the final component is responsible for rendering of immersive audio and high-resolution video. Immersive audio is a technique developed at IMSC for capturing the audio environment at a remote site and accurately reproducing the complete



rmi enables people to experience an event that is taking place somewhere else

audio sensation and ambience at the client location with full fidelity, dynamic range and directionality for a group of listeners. The RMI video is rendered in HDTV resolutions (1080i or 720p format) and transmitted at a rate of up to 45 Mb/s.

#### What do you expect from RMI?

The goal of the RMI technology is to immerse people into an aural and visual environment so that they can experience an event that is taking place at another time or place. I am envisioning applications such as a boxing match recreated in bars or a royal wedding transported live to movie theaters around the world. Eventually, with the necessary technical advances, immersive RMI environments will be possible in the home to enable the ultimate combination of the Internet

and the home theater. Beyond entertainment, children may use these environments as "time machines" to learn about new places and other people.

#### What is necessary to make RMI happen?

There are two technological trends that will make RMI environments possible in the home in the not too distant future. First, compression algorithms are improving and the same high quality video can be transmitted with fewer and fewer bits. Second, residential networks are constantly improving and gaining speed. Soon these two trends will cross and then RMI to the home will become a reality. ■

**New forms  
of home  
entertainment  
with RMI**

#### DER AUTOR

**Sasa Ignjatovic** ist ein Enthusiast der zeitgenössischen Kommunikationstechnologien, Breitbandfan und Mitarbeiter bei .copy.