



2nd International Symposium on Emerging and Industrial DLP® Applications

Sponsored by:



Visitech AS
Drammen, Norway



a *Digital Imaging*® Company
In-Vision Digital Imaging GmbH
Guntramsdorf, Austria



Texas Instruments Inc.
Plano, TX, USA (tentatively)



Industrie- und Handelskammern
zu Dillenburg und Wetzlar

Chambers of Commerce and Industry
in Dillenburg and Wetzlar

Date: November 27, 2007

Time: 09:30 h – 17:00 h

Location: Ernst-Leitz-Saal and Moritz-Hensoldt-Saal
(Center for High Tech and Culture)
Steinbühlstraße 15 C, 35578 Wetzlar, Germany



Program and Schedule

- 09:30 h Welcome by Photonic Center Hessen in Wetzlar AG
Dr. Norbert Lauinger, CEO PZH in Wetzlar AG
 - 09:35 h Welcome
Peter Hauptvogel, Department Head Economics, City of Wetzlar
 - 09:45 h DLP® technology: Products and Channels, Field of Applications, Technology
News (also from Projection applications)
Eric Braddom, Texas Instruments Inc.
 - 10:15 h Light Sources for Microdisplay applications
Ad van den Brandt, Philips Lighting
 - 10:45 h Coffee Break
 - 11:15 h LED illumination optics for imagers
Dr. Peter Schreiber, Fraunhofer IOF
 - 11:45 h Building Blocks in DLP Formatter development
Oyvind Tafjord, Visitech AS
 - 12:15 h Illumination and Imaging optics for a DLP® Photostimulation System
Prof. Erhard Ipp, In-Vision Digital Imaging GmbH
 - 12:45 h Lunch break
 - 14:00 h Optical Solutions for DLP® Applications
Holger Sehr, Carl Zeiss AG
 - 14:30 h Micro- and nano-structured components in optical systems
Prof. Dr. Theo Tschudi, PZH in Wetzlar AG
 - 15:00 h Coffee Break
 - 15:30 h OneLight – Programmable Lightsource
Ulrich Stange, OneLight Corp.
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- 15:50 h 3D Monitor for Medical Applications
Hartmut Runge
- 16:10 h Dynamic Micromirror Uncaging: a New Tool to Study Neuronal
Network Physiology
Dr. Clemens Boucsein, University of Freiburg
- 16:30 h Augmented Astronomical Telescope: A DLP® Application in Astronomy
Andrei Lintu, Max-Planck-Institute for Informatics
- 16:50 h Closing words
Alfred Jacobsen, OpSys Project Consulting
- 17:00 h End of Session

Moderation: Alfred Jacobsen, OpSys Project Consulting



LARGE DISPLAY REPORT

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Light Modulation Devices



Alfred
Jacobsen

TI + Others At Second DLP Apps Symposium

After its inaugural and very successful appearance in 2006 the 2nd International Symposium on Emerging and Industrial DLP Applications was held in Wetzlar, Germany in November 2007. The event was squeezed into a schedule full of other trade shows and conferences during the

same period, and was organized again this

year by **OpSys Project Consulting**

(www.opsysconsult.com), **Photonik**

Zentrum Hessen in Wetzlar AG ([www.pzh-](http://www.pzh-wetzlar.de)

[wetzlar.de](http://www.pzh-wetzlar.de)) and the photonics competence

network **Optence e.V.** (www.optence.de). It

drew an impressive number of almost 100 attendees from 17 countries, coming from

Europe, North America and Taiwan.

The one-day conference brought together product developers and users of the DLP technology with **Texas Instruments** and their system development partners in optics, electronics and system integration.

Presentations on this wide variety of topics as well as 15 exhibitors triggered attention and intense discussions between users and



solution providers.

Eric Braddom, the business manager for DLP Catalogue Products, emphasized the importance of emerging and industrial applications to Texas Instruments. To cover the growing demand for technical support, a team of dedicated hardware and optics engineers has been formed to closely follow and respond to the needs of product developers in diverse fields such as photochemistry, industrial displays, optical computing/image processing and adaptive illumination using UV, IR and visible light. In addition the options for users of the technology have been broadened through an agreement with **Visitech AS** of Norway, using their **LUXBEAM** formatter platform to grant access to the entire spectrum of DLP projection display formats for industrial applications.

New products such as the Discovery 4000 with 2x LVDS interface will be available this quarter, opening up the implementation of other display formats in industrial products. The new

formatters double the frame rates to an impressive 32,600 binary frames per second at XGA resolution and 23,000 frames with the 1080p chip.

Two video clips demonstrated how such industrial applications have already entered our day-to-day life. One video featuring **Actuality Systems'** volumetric display (see additional coverage in 3D displays) was shown in the TV show, *CSI New York* and the other demonstrated **Luminetx'** Vein Viewer, a medical device supporting doctors and nurses to easier identify the veins for injections.

In his highly acknowledged presentation Prof. Erhard Ipp, Chief Scientist at **In-Vision Digital Imaging GmbH** from Austria introduced the audience into the complex development process of an optical system for a scientific biotechnology application, using photo-stimulation



with N-UV to observe neuronal processes in tissue. Starting with the process of lamp selection and illumination design to maximize the system efficiency, he then explained in detail the imaging lens design process encountering the constraints and limitations introduced by optical specifications and mechanical limitations of the microscope system, this device is attached to. Significantly advanced results have been achieved with the DLP-based system and In-Vision Digital Imaging is now in discussions with their partners to commercialize the system.

System efficiency optimization and illumination design is a critical aspect in most system designs. Almost as an affirmation of this, two other presentations examined this point in detail. One from **Philips Lighting** described the range of UHP products with a variety of wattages and a strong push towards miniaturization down to 36mm diameter reflectors with 50W and shorter arc gaps of 0.7mm. Ad van den Brandt also was building a bridge from the large scale volume products towards specialty products, expressing Philips' position of providing appropriate support independent of volumes.

In a presentation given by Dr. Peter Schreiber from **Fraunhofer IOF** in Jena, he described the joint effort undertaken together with their partner **Osram Semiconductors** to optimize LED efficiency in optical systems with different types of refractive-reflective concentrators, tandem lens array integrators and color combining designs. The organizers were excited to present these hot results of high tech research from Germany. Just a week later, the Fraunhofer IOF, together with Osram, was awarded the German Future Prize by the German Federal President Dr. Horst Köhler.

Building blocks for accelerated electronics development and system customization were explained in detail by Oyvind Tafjord of **Visitech AS** in Norway, one of the event's sponsors. A wide variety of subsystems and reference designs give optimized access to the DLP display products from projection and easily allow adapting them into industrial product developments. A



significant reduction of costs and especially development risk is the consequence. Their expertise as an independent DLP design house gives Visitech the opportunity to respond to diverse customer demands.

Perspectives for ultra-compact optical systems were outlined by Prof. Theo Tschudi of the **Photonik Zentrum Hessen in Wetzlar AG** by introducing diffractive and holographic optical components, i.e. microstructures embossed into optical polymers with replicating processes. A wide variety of optical functionalities can be incorporated in relatively flat, almost 2-dimensional components. He demonstrated structures that operate as polarizing beam-splitters or others that form color combiners, eliminating the need for dichroic filters or cubes for spectral recombining. Narrow band light sources like LEDs or Laser diodes will foster implementations of diffractive components in future applications.

The final part of the symposium again was dedicated to applications. To trigger product



developments with DLP technology, a variety of applications were covered by short presentations describing implementations and product features. An entirely programmable light source was described by **OneLight Corp.** of Canada, dispersing light from a broadband continuous light source onto the DLP display and using the switchable pixels to select specific spectral bands and to level brightness - a powerful tool for

researchers in biotechnical and medical applications.

An autostereoscopic 3D display for medical applications was described and demonstrated by a private design team in cooperation with the **FraunhoferPST**. And last but not least Dr. Andrei Lintu from the **Max Planck Institute** in Saarbruecken, Germany reported on his research results with augmented reality in an astronomical telescope by using a DLP projection device to overlay digital images over the telescope image. This offers an unlimited observation experience even on a cloudy day.

The equally positive feedback on this 2nd Symposium for Emerging and Industrial DLP Applications encouraged the organizers to announce the next symposium date, set for the end of 2008. –*Alfred Jacobsen*