EPIC Members Event Report
LED professional Symposium +Expo
Bregenz, Austria
24-26 September 2013
www.led-professional-symposium.com

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About the EPIC Members Event Reports
Initiated by the founder of EPIC Dr. Thomas Pearsall in 2003, these reports are prepared by members of EPIC to the benefit of the wider community. If you did not have a chance to attend the event but would like to know some key highlight, this report is for you. Emphasis is placed on exploring technical and business opportunities for the members of EPIC. If you are an event organizer and would like your event covered by EPIC, if you would like to volunteer for writing a report, or if you have any comments to this report, please contact info@epic-assoc.com
General Overview

The 3rd edition of the LED professional Symposium (LpS) took place in Bregenz, Austria on 24-26 September 2013. The LpS consisted of a conference with 46 presentations, 6 workshops, 2 tech-panels, and an exhibition with 80 international exhibitors. The event was attended by more than 1000 people from all over the world. The conference was accompanied by a very interesting social program which offered further possibilities for networking in a relaxed atmosphere. On the first evening the visitors were shown a Light Art Project at the Vorarlberg Museum presented by Zumtobel and on the second evening there was a boat trip with live entertainment on Lake Constance.

Social program: Light Art Project in Bregenz and boat trip on Lake Constance

The conference consisted of two parallel tracks plus two optional workshop tracks and the exhibition. In the conference tracks there were special breaks for the exhibition, so that the visitors could take a look at the exhibition without missing important presentations. In two of these breaks there were Tech-Panels in which ideas on future trends and lighting solutions could be discussed with industry leaders and visionaries.

Siegfried Luger opening the LED professional Symposium

The event was very well organized by Siegfried Luger from Luger Research and his team who is also the publisher of the LED professional Review. When you register you get a box including the printed proceedings as well as several LED related magazines and information on the city for those who are the first time in Bregenz. What I appreciated even more than the printed proceedings is the opportunity that they can be downloaded in electronic from as well (which makes it much easier to archive and search for particular topics). The participants can even choose whether they like to download the entire conference presentations in one file or whether they prefer only to download the presentations of a certain session.
The main focus of the conference was on the light sources and driver & controls but there were also sessions on LED future, optics, LED systems, thermal management and applications. The workshop program has also been noticeably extended compared to last year. This year, six workshops were offered in 2 parallel tracks on specific LED technology topics. The subjects of Reliability and Thermal Testing, Standardization, 3-Dimensional System Designs and Optics, Printoptical Technology, Computer Supported Design of LED and OLED Systems as well as Qualification and Reliability were discussed and explained in an interactive environment.

Due to the increasing number of exhibitors, the exhibition area was increased by 20% almost 2,000 m². There were even some new product launches presented in the exhibition: Cree for example launched the first high-performance LED array.

This year the Tech Panels were open to the public for the first time. Dietmar Zembrot (President of LightingEurope and CEO of TRILUX), Klaus Vamberszky (Executive Vice President of Technology at Zumtobel), Christian May (Head of Business Unit Lighting and Flexible Integration at Fraunhofer), Nicola Trivellin (Researcher at the University of Padova) and Henk Veldhuis (Chair of the Technical Advisory Working Group of the Connected Lighting Alliance) were discussing “LED & OLED Lighting Innovations- How to Break Through” on 24 September. On 26 September the international press was discussing “Lessons Learned” to wind up the symposium. In order to make the Tech-panels even more interactive, they were broadcasted live online and the viewers could submit questions.
Workshops

Six workshops were offered in two parallel tracks. The workshops offered detailed analyses in the areas of Reliability and Thermal Testing, Standardization, 3-Dimensional System Designs and Optics, Printoptical Technology, Computer Supported Design of LED and OLED Systems as well as Qualification and Reliability.

On Day 1, Mentor Graphics was offering a workshop titled “Reliability & Thermal Testing”. The workshop explained how the junction temperature depends on both the LED package and the system on which it is mounted. Attendees learned how thermal performance of LED packages and systems can be measured and characterized for reliability improvements.

On Day 2, Underwriter Laboratories (UL) informed attendees on the topic of standardization. Here, the development of standards, IEC updates, energy efficiency programs (ES, LF, DLC, ErP), Zhaga updates, lighting controls and RoHS regulatory updates were presented.

Day 2 was also host to the LPKF and Essemtec workshop on 3-Dimensional System Designs and Optics. Participants got a complete overview of an innovative production process for creating three-dimensional LED layouts for a wide variety of lighting sources (SSL, automotive lighting, etc.). Each LDS (SPELL OUT LDS) process step from the selection of thermally conductive materials, functional LDS coating of the heat sink, laser structuring, dispensing of glue or solder paste for fixing the LED on the substrate to the final 3D placement of the LEDs on components was discussed.

Following that, there was a workshop entitled “Printoptical Technology” presented by LUXeXcel. Printoptical technology makes it possible to produce 3-dimensional optics with which lenses and light distribution structures are made. The changes in the lighting industry that this new production technology brings were discussed.

The last day of the symposium hosted the “Design Workshop” from Arrow, NXP and Transim. Deep-seated knowledge in the areas of component data and system elements such as cooling devices, optics and electronics that is needed for the design of LED lighting systems in order to be able to attain the necessary light requirements were discussed. Participants got an overview of modern simulation and configuration tools that are designed to improve R&D performance, quality and costs processes.

Cree was running their workshop on the subject of “Testing” on Day 3. This was a discussion of step-by-step improvements of an existing luminaire design. Participants learned how to differentiate and make use of several experimental runs based on CREE TEMPO test results to optimize their luminaire design process.
Highlights from selected presentations

Technology Push, Market Pull, Keeping a Sense of Proportion
Annetta Kelso, Senior Marketing & Training Manager LED Systems Philips Lighting OEM EMEA, The Netherlands

The presentation was about LED transformation in the lighting market, with a main emphasis on professional business to business lighting market incorporating project business and trade. It showed how the introduction of LED technology changes the market and opens new opportunities as well as new threads. With LED light sources there are some general observations that can be made so far:

- Any LED light engine, based on a platform that is quickly outdated or requires changes with every upgrade, will be harder to sell in large volumes and is prone to generate irritation.
- LED light engines with specifications outside of market needs or norms will also cause frustration.
- LED light engines or luminaires that are overdesigned or add functionality that is not needed in a certain application are tempting but often a mistake in a market that is extremely cost sensitive.
- Another source of frustration are companies making hugely exaggerated claims about the performance of their LED products with reference to conventional light sources which are blatantly not true.

An essential point is innovation that makes sense, based on deep understanding of market needs and not innovation for innovation’s sake. Successful LED market transformation for manufacturing companies is not just about recruiting the best technology staff or having the best marketers to promote the company. It is the correct combination and cooperation of the two.

OLED Module Technologies for Professional Lighting Applications
Jörg Amelung, General Manager OLED, Tridonic Dresden, Germany

Organic light emitting diodes (OLED) allow complete new lighting integration opportunities in different applications. Due to the slim form factor, it is possible to realize lighting solutions with very thin elements and high lighting homogeneity. Currently OLED solutions are mainly in the field of decorative lighting to reach the professional lighting applications OLEDs have to improve in technical parameters and cost aspects.

The presentation gave a good overview of the technology, development and current status of OLEDs and where they could be best applied. A very nice example was an OLED luminaire where the front side could be used as mirror in the off state or luminaires consisting of many OLED modules with a kinetic movement. Nevertheless it was also pointed out that an elegant OLED solution needs also a thin converter. The thick converters for classical lighting solutions reduce the integration possibilities significantly.

Advancing Remote Phosphor Technologies
David Nauth, Sales Director, Intematix, USA

General lighting has implemented remote phosphors beneficially to lower costs and to address issues with glare, consistency and performance present in conventional white LED lighting. The quality of light is measured in 3 key areas:

- Color Rendering Index (CRI) 0 to 100 (the sun is 100)
- Correlated Color Temperature (CCT) 1850 – 6500 Kelvin
- Uniformity (Intensity: consistent brightness over angle and illuminated area, Color over angle (COA) and even CCT over angle)
Remote phosphor addresses all three better than conventional white LEDs. The advantage of remote phosphor is that it is based on recycling and converting more blue photons to white light. The direct result is the need for fewer LEDs and therefore less power and producing less heat. Less heat on the other hand means better stability and longer life times.

Remote phosphor offers also more flexibility since the color temperature of a luminaire can simply be changed by changing the remote phosphor plate. The current remote phosphor solutions have also an improved white off-state appearance and are no longer yellow in the off-state.

Optimized Devices for Lighting Applications
Shawn Keeney, Applications Engineer, Cree, USA

For anyone designing a luminaire or lamp using LEDs, choosing the best device for a specific lighting application can be quite a daunting task. Dozens of manufacturers from around the globe offer a plethora of LED package types ranging from magnitudes of $10^{-3}$ to 102 Watts of electrical power. When faced with making this decision, there are a number of critical factors affecting the performance that must be considered and weighed against cost. These include luminous flux, luminous efficacy, optical source size, chromaticity, color rendering, thermal resistance and perhaps most importantly long-term reliability.

In the presentation Shawn Keeney discussed in great detail why each of these parameters is critical and how to determine the type of LED that is best suited for various example applications such as outdoor area lighting, A19 style replacement lamps, directional lamps and linear luminaires.

LED Light Sheet Technology as an OLED Alternative
Uwe Hock, Sr. European Business Development, Cooledge Lighting, Canada

The presentation of Cooledge consisted of two parts. Uwe Hock discussed their new flexible lighting system and in the demonstration he showed the actual system with and without diffusors. The Cooledge light sheet combines the mechanical, electrical and LED source together into a flexible sheet of light. Basically it consists of LED arrays with a pitch of 7mm or 12 mm put on a flexible substrate which could also be cut at certain length intervals.

If a diffuser is put above the light sheet, you get a very homogeneous light source that is flexible like a flexible OLED. However there is a price to pay for this homogeneous illumination: depending of the LED pitch the thickness of the entire system increases to ~1.2 cm respectively ~2.5 cm. If this thickness is no problem in the application, you get a homogeneous and flexible light source.

Dimensions of Light Quality in LED Spot Lights
Ralph Bertram, Application Engineering SSL, OSRAM Opto Semiconductors, Germany

Dimensions of light quality are multiple: a rich color spectrum enables good rendering of object colors but there should be no color variations visible. There shouldn’t be any difference in color between lamps. In spot-lights the beam shape must fit the illuminated objects. Tight beam angles are a special challenge for LED solutions. Last but not least the luminaire itself should be aesthetically designed but thermal as well as optical challenges need to be considered.

In the presentation these points were discussed in great details. The discussion of the color quality for example included which impact an optimization on energy efficiency would have on the color quality or which impact the different color temperatures have. The discussion on color consistency not only included the usual binning but also alternatives like mix-to-match where LEDs with different color temperature are combined to get the target color temperature.

Next LED professional Symposium
For additional information, please contact the author of this event report:

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zumtobel group

The Zumtobel Group is one of the few global players in the lighting industry. The Group offers a full range of professional indoor and outdoor lighting, lighting management systems and lighting components as well as innovative LED and OLED technology. Based in Dornbirn in the Vorarlberg region of Austria, the Group posted sales of EUR 1,243.6 million in the financial year 2012-2013 and currently employs a workforce of approximately 7,160 employees worldwide. www.zumtobelgroup.com

About EPIC – European Photonics Industry Consortium

EPIC is a membership-led not-for-profit industry association that promotes the sustainable development of organisations working in the field of photonics. Our members encompass the entire value chain from LED lighting, PV solar energy, Silicon photonics, Optical components, Lasers, Sensors, Displays, Projectors, Optic fiber, and other photonic related technologies. We foster a vibrant photonics ecosystem by maintaining a strong network and acting as a catalyst and facilitator for technological and commercial advancement. www.epic-assoc.com

EPIC Members (1 October 2013)


EPIC event report on LED professional Symposium 2013