NEWSLETTER of the SID-MID EUROPE CHAPTER

SID-ME

Nr. 10,
December 2000

SOCIETY FOR INFORMATION DISPLAY

SID-Mid Europe Chapter meeting on Automotive Displays at BMW Munich / Germany, October 13-14, 2000.

The topic of the technical meeting in Munich Germany was automotive displays. Over 160 people attended the meeting.
The meeting was opened by *Dietmar Theis*, SID-ME Director and *Jyrki Kimmel*, SID ME Chair. This conference aims to be a balanced mix of technology and applications.
Mr. Frischkorn gave a welcome on behalf of BMW. He underlined that the use of displays in car applications will increase dramatically in order to enhance pleasure in driving. Displays in cars will be commodity to reduce costs.

Session 1.

The first speaker was *Heinz-Bernard Abel (Mannesmann VDO AG)* with a lecture on displays that conquer the Man Machine Interface (MMI) in vehicles. MMI is technology driven. After mentioning the system requirements, he discussed the specific requirements for automotive displays like appearance, reliability, mechanics and electronics and last but not least the price. Mannesmann VDO made a design study of a cockpit info system including several displays. In future a reconfigurable display cluster based an a-Si display and a rear projection system in the cockpit's centre console are foreseen.
Dan d'Almeida (Planar Systems) gave a lecture on Commercial Vehicle Display Applications - Trends and Issues. He focussed on commercial vehicles (trucks) and gave an overview of driver's distraction which is an issue. Human factors and display readability contribute largely to the driver's frustration, therefore visual clutter should be minimised. Internet connectivity will have a big impact. Practical recommendations for improving readability were given. Contrast is paramount in reducing the "glance time" for drivers. Emissive displays offer still superior contrast. Display performance becomes increasingly important when moving to larger, higher resolution colour graphic displays.

Rob Hendriks (Philips Mobile Display Systems) presented how in development of a typical display an applied structural approach will led to a high performance display. A simple model is extracted from experimental data and simulation. This is combined with the known data of production spread and the typical product requirement to give a design window. This was illustrated with a design for a STN display.
By this approach it is possible to assure a robust display design although the performance demand is increasing.
Rob Katalenic (Virtual Prototypes Inc.) talked about the specifications of optimal, human-friendly communication of your complex multifunction devices in cars. Since car displays become more complicated there are a lot of challenges for Human Machine Interaction. Virtual prototyping technology combines HMI specs and development processes with which the automotive industry can accurately test and simulate through iterative processes the current and future in vehicle displays. An example was the development of a driver information system.

Session 2

Werner Becker and Michael Heckmeier (Merck KGaA) presented details on market shares and future trends in FPDs. Thereafter he discussed requirements and application of LCDs in cars and more specific for high resolution graphic displays. New LC substances show lower rotational viscosity, high $\Delta\varepsilon$ and high T_C. They have been used to compose new, improved LC mixtures for low voltage application, a broad operating and storage temperature range.
Yozo Narutaki et al. (Sharp Corporation) described the development of an advanced TFT display. The usual transmissive LCD performs poor in direct sunlight, the reflective LCD is poor in dark conditions. The 6.5" advanced TFT LCD has a pixel layout with both reflective (60%) and transmissive (40%) parts. The display have been evaluated by measuring both the luminance and colour gamut as a function of illumination intensity (up to 70.000 lux). An additional subjective evaluation with people pointed out that that the advanced TFT is better for both text image and photo images. The advanced TFT display is especially good in outdoor applications.

Christian Lauenstein (Optrex Europe GmbH) presented high resolution LCD technologies for optimized reflective operation. He considered especially high resolution LCDs in reflective, transflective and transmissive modes. The surface brightness as a function of the ambient light level is the major point. The transflective B/W and colour display were discussed. Major challenges are: the diffusive layer, optical & LC design, mirror, color filter and surface treatment e.g. AR-coating.
M. Seibold et al. (Helbling Technik GmbH) gave a presentation on a mercury free backlight for automotive multimedia LCDs. One approach is a planar backlight is based the barrier discharge type with Xe-gas and co-planar electrodes. The benefits are: mercury free, high luminance, efficacy 30 lm/W, life 100.000 hrs, 0.25-0.6 €/cm^2, instant light and dimmable down to 5%. Linear lamps like proposed by Harrison can be combined into edge-lit combination with an efficacy of 22 lm/W. White LEDs have an efficacy of 15 lm/W and cost about 1 Euro.
It was concluded that in future the backlight can operate without mercury.

Session 3

Robert Isele (BMW AG) discussed the application of transflective displays in driver information systems. He started with the history of displays within BMW. For the future, customer comfort like readability, clear and sharp pictures will result in display features like sunlight contrast and dimmability for night driving. Power consumption has its own limit due to the allowed dashboard temperature. Low temperature brightness can be an issue due to the slow start of CCFLs. BMW now applies the advanced TFT display (see session2: contribution of Yozo Narutaki) in its cars. The self-heating backlight performs well. Future trends include digital driving of displays, passive transflective technology and a highly integrated user interface.
Bernhard Senner (Audi) gave a paper on white displays. He gave an historical overview of the selected display colour in Audi cars. In 1982 the red display illumination was introduced. A combination of red and white was selected in 1998 for the illumination of a colour D-STN in the Audi-A8. Later developments include the 5" TFT-LCD display. White displays are preferred due to the readability of older people who have problems with focussing of red characters. A wide spectrum display has an easier perception for everyone. However good quality white displays are delicate, since the human eye is very sensitive to colour changes (e.g. due to temperature, viewing angle etc.) in unsaturated colours. At present work is on going to find the best combination of backlight (CCFL, LED) and LC effect (TN, MTN, DSTN). When the characteristic data of both backlights and displays are available in a database combinations can easily be compared.
Peter Radojkovic (BMW AG) focussed on the automotive applications of OLEDs as self emitting car displays. The customer feeling is the most important guide rule for Man-Machine-Interface design. Self emitting displays must therefore have a brightness larger than 200 Cd/m^2 for sunlight readability and a dimming ratio down to 1 Cd/m^2 for night use. The principle of OLED was explained. OLED is one of the promising new display principles good for low information application, low cost and with a good development potential.
Some remaining issues for OLEDs are; lifetime ate high tem-

perature, stability and homogeneity over life, burn in, high specular reflective cathode and no compatibility to LCDs.

Kay-Uwe Schenke (3M Laboratories GmbH) elucidated optical films to enhance modern displays. Several 3M products like light control films and circular polarizers can be used on viewers side of the display to reduce the glare. For the display itself there are transflectors with integrated micro-glass bead diffuser. Several technologies exist for application at the backlight side to enhance the brightness with e.g. BEF foils and reflective polarizers like D-BEF.

Hans-Ulrich Lauer (BORG Instruments AG) presented a paper on gamma correction for TFT LCDs. This is needed to display pictures with a natural gray-scale reproduction. Since the output characteristic of the CRT is much different from that of a Normally White LCD, pre-processing of the input signal of the TFT-LCD is required to achieve the same gray scale appearance of the CRT. Three methods to apply gamma-correction were discussed: gamma correction with LUTs, analog gamma correction by using dedicated IC and gamma correction within the column drivers where the digital signal is non-linearly converted.

Session 4

Bernd Straub (DaimlerChrysler AG) talked about display technologies for in-car applications. People like to have new attractive developments enabled by displays like cellular phone, palm and others also in their cars, but a confusing cockpit is not desirable. At present a 5" display is applied in Daimler-Benz cars but this needs to be larger. Cockpit integration may lead to a re-configurable instrument cluster, where you might select your favourable choice. Essentials for cockpit integration are : ergonomics, design, software and technology. Traffic attention and distraction minimisation are the basic ergonomic rules. A list of stringent automotive requirements for displays was presented.

The challenge is to invent new multimedia displays for in car applications.

Karlheinz Blankenbach (University of Applied Sciences Pforzheim) gave a paper on multimedia travel systems. Such a system could be used as car navigation add on , mobile digital guide or multimedia information in public transportation. The basic system consists of position dependent (via UMTS mobile phone) travel system which is wireless connected to databases. It delivers a position dependent multimedia output. An demo of the MOBIDIG was given.

Eric Maiser et al.(Institute für Mikrotechnik Mainz GmbH and VDMA) explained that although the biggest markets for display applications are in Europe and the USA, major production of displays is in Asia. The Deutsches Flachdisplay Forum seeks ways to promote investments for display production in Germany and Europe. Europe is worlds largest car producer (37%), but display production is the missing link. The DFF prefers OLEDs and ruggedized TFT-LCD as carriers for new initiatives.

Mrs. Gabi Binasch (Philips Mobile Display Systems) discussed if displays in mobile systems would have impact on in-car screens. She indicated market trends: connectivity and high speed data transfer. For mobile phones internet access and the display of images will be the next step followed by picture phone and video phone including browsing and video display. For integration of a hands free device into the car fast 2.3 - 3 Gbyte data transmission towards and from the car is required. Conclusion: mobile device display system features will move into the automotive environment

Session 5

Christoph Kindl (Infotec Soft-und Hardware GmbH) talked about the physically nearly exact simulation of displays in vehicles. The tool is Virtual Reality -design that makes use of display characteristics together with material characteristics e.g. the reflection of interior materials. It enables the simulation of displays in vehicles, also under an angle. An video clip was shown as a demo.

Mrs. Mitslal Kifleyesus-Matschie (Eurocontact) explained that 3D auto-stereoscopic display and projection are the important pillars of knowledge based automobile industry. She told that a quick change is going on from the conventional 2D towards the 3D technologies. Almost 50% of the automobile, aerospace and shipbuilding industries use 3D technologies. 3D auto-stereoscopic displays in vehicles have several advantages like improved presentations of intersections of maps. 3D application in displays is possible by the use of 20" high resolution LCDs with a lenticullar lens system on top of the LCD in order to address the left and the right eye.

Heiko Baruth (Visteon Corporation) presented the Re-configurable Projected Image Display which would be able to be used instead of more displays in cars. The system is fully reconfigurable by software. In fact it is one system to cover all optical needs in the car. Systems components are: light source, rotating colour wheel, DMD (from TI), optical system and a projection screen. Major targets for the future are to shrink the optics and reduction of the optical path

Formal SID ME Chapter meeting

Jyrki Kimmel made a few announcements. As there is a growing industrial activity in displays we should also increase the number of SID memberships especially in Europe. This will become increasingly attractive since there are several benefits connected with the SID membership due to the free personal access to the SID web side which will contain e.g. the digest of previous SID meetings. The possible location for next meet-

ings was discussed and the discussions on a rotating European display conference.
Finally it was announced that we have a surplus in our financial account.

Guided Tour through BMW's Development Centre

At Friday evening we had a guided tour through the BMW 's Development centre. It was fascinating to see all kind of design tools that are used like close to reality mock-ups and 3-D representations. Accelerated life tests and a impressive set-up for the testing of car front lights emphasised the attention for safety issues.
The evening was closed with a buffet dinner in an informal and animated atmosphere.

SID – ME

Coming: SID-ME Chapter Spring 2001 meeting.

April 5 and 6, 2001

at the Delft Institute of Microelectronics and Submicron-technology in Delft, Feldmannweg 17, the Netherlands.
The topics of this meeting will be

AMLCD, Micro-mechanical and OLED displays


Old Delft

You are kindly invited to submit papers for this meeting and to mark your calendar. The meeting will start on April 5 at 12.00 a.m. and will end on April 6 in the afternoon.
During this meeting the formal annual elections of the Chapter Committee will take place.
The beautiful historical town of Delft is located in the western part of the Netherlands. More details will become available early 2001.
For more information contact: Jaap.Bruinink@philips,com.

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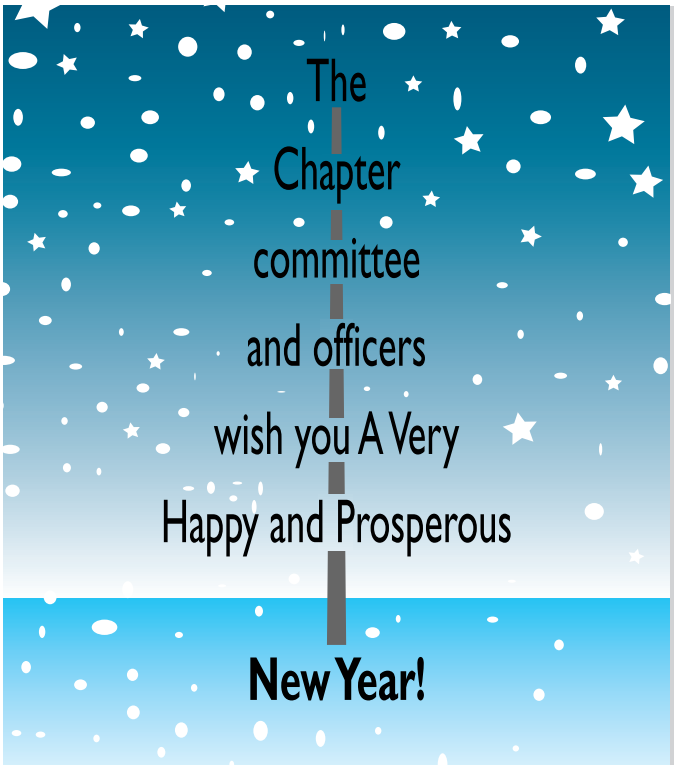

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SID payment.

The SID has changed the annual membership fee to US$ 75. Please note that the membership is now a rolling membership, which means that it runs 12 months from the month in which the payment was made. For more information see the SID website www.sid.org.
We encourage our members to pay directly to SID-HQ in the USA, but if they want to pay to the ME-Chapter directly the annual fee should be €90 **with all bank fees covered by the member!**
In case of direct payment to the SID-ME Chapter the payment in € should be done to

Account no.:	206 020 1104
at:	Berliner Sparkasse, Berlin,Germany
Bank code:	BLZ 100 500 00
Account name:	Frank Rochow, SID-ME

Please indicated your name on the remittance papers.

The Newsletter.

If you want to place an article in the Newsletter, which is interesting for the European display society, please send it to: J.Bruinink, fax: +31 40 274 4335,
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(preferably as plain text, not as a Word or Wordperfectfile.)