



Nuova generazione di proiettori: la Tecnologia HD a cristalli liquidi permette la distribuzione della luce in modo adattativo e in tempo reale.

- **L'Integrazione di un Liquid Crystal Display (LCD) in un Proiettore LED apre a nuove frontiere nell'Automotive Lighting.**
- **I Proiettori LCD regolano la distribuzione della luce in base alle differenti situazioni di traffico, in maniera continua e in tempo reale.**
- **30.000 pixels garantiscono la proiezione dell'immagine alla distribuzione adattativa della luce.**

Lippstadt, Giugno, 2017. Nell'ambito del progetto di ricerca avviato dal Federal Ministry of Education and Research (BMBF) circa la distribuzione adattativa relativa alle specifiche di efficienza e sicurezza dell'illuminazione per veicoli (VoLiFa2020), gli esperti di Illuminazione ed Elettronica di HELLA hanno progettato e realizzato un proiettore contenente la tecnologia LCD in collaborazione con alcuni partner di come Merck, L'Institut für Großflächige Mikroelektronik IGM, l'Università di Stoccarda, Porsche, Elmos Semiconductor, Schweizer Electronic, e l'Università di Paderborn. Questa tecnologia è già conosciuta ed utilizzata nel campo dell'home entertainment. "Per la prima volta abbiamo integrato la tecnologia LCD in un veicolo. Grazie all'alta risoluzione e alla nitidezza dei dettagli, si aprono nuove frontiere nella tecnologia dell'automotive lighting", ha detto il Dr Michael Kleinkes, Vice President Development Lighting & Innovation at HELLA.

Il nuovo proiettore LCD proietta 30.000 pixels sulla strada: questo permette di adattare la luce in maniera intelligente e continua alle varie situazioni di guida ed in tempo reale. "L'utilizzo di un display a cristalli liquidi è un ulteriore passo in avanti verso il lighting digitale", dice Christian Schmidt Head of Lighting Technology Pre-Development di HELLA. Questo significa che l'adattamento della luce sarà sempre di più controllato dal software e il guidatore potrà contare sulla migliore visuale possibile della strada. Singole unità possono essere spente o regolate in base a fattori addizionali nel traffico o cartelli stradali particolarmente riflettenti. Anche funzioni molto complesse sono



possibili: possono essere proiettate sulla strada frecce o linee direzionali che indicano il percorso. "la tecnologia LCD permette inoltre alcune funzioni utili alla guida autonoma", dice Christian Schmidt. "Lavoreremo affinché questa tecnologia sarà applicabile alla produzione di serie"

Il display a cristalli liquidi è il componente principale del proiettore. Questo è situato tra la sorgente luminosa LED ed il sistema di lenti. Il display genera una matrice di 100 x 300 pixel che possono essere comandati e regolati individualmente. Una telecamera installata sul veicolo ed un sensore ottico che rileva distanza e velocità (LiDAR), invia le informazioni ambientali all'unità di controllo del proiettore attraverso un processore. Questo comanda i singoli display fino a 60 volte al secondo. 25 LED ad elevata potenza sistemati in tre file sono la sorgente luminosa. L'intensità di ciascun LED viene regolata ad ogni situazione.

HELLA ha sviluppato il proiettore con sistema ottico LCD durante il progetto di ricerca. I requisiti richiesti dal costruttore Porsche, il Research Institute for Lighting Technology and Mechatronics dell'Università di Paderborn (L-LAB) ne hanno creato le fondamenta. Assicurare l'elevata efficienza del sistema nonché le relative caratteristiche termiche compatibili con i requisiti dell'industria automotive sono alcune delle attività in carico ad HELLA. In questo caso è necessario uno speciale cristallo liquido che è stato appositamente sviluppato dalla Merck e che l'IGM dell'Università ha utilizzato per la realizzazione del prototipo. La Elmos Semiconductor ha progettato e realizzato alcuni innovativi componenti semiconduttori e la Schweizer Electronic ha assemblato il PCB (il circuito stampato) con un processo totalmente nuovo. Questa tecnologia permette di realizzare un'affidabile, efficiente controllo dell'unità LED. HELLA realizza la perfetta integrazione di tutti i componenti nell'intero sistema e sviluppa l'interfaccia tra l'unità di controllo e il proiettore. Un prototipo installato su una Porsche Panamera è attualmente in fase di test da parte dei collaudatori dell'Università di Paderborn.

Per effetto del traffico in costante aumento e delle sempre più severe normative sulla sicurezza i sistemi di illuminazione intelligente saranno sempre più diffusi e la



tecnologia LCD presenza significative opportunità in questo campo ma non solo nel segmento delle autovetture ma anche per veicoli commerciali, industriali bus e molte altre applicazioni.

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HELLA KGaA Hueck & Co., Lippstadt: HELLA is a family-owned, listed company operating on the international stage and currently employing approximately 36,000 members of staff at more than 125 locations in about 35 countries around the world. The HELLA Group develops and manufactures lighting technology and electronics for the automotive industry and also has one of the largest retail organizations for automotive parts, accessories, diagnostics, and services within Europe. Joint venture companies furthermore create entire vehicle modules, air-conditioning systems and vehicle wiring systems. With more than 6,000 people working in research and development, HELLA is one of the most important innovation drivers on the market. Furthermore, with sales of 6.4 billion euros in the fiscal year of 2015/2016, the HELLA Group is one of the top 40 automotive parts suppliers in the world and one of the 100 largest German industrial companies.

Merck KGaA: Merck is a leading science and technology company in healthcare, life science and performance materials. Around 50,000 employees work to further develop technologies that improve and enhance life – from biopharmaceutical therapies to treat cancer or multiple sclerosis, cutting-edge systems for scientific research and production, to liquid crystals for smartphones and LCD televisions. In 2016, Merck generated sales of € 15.0 billion in 66 countries. Founded in 1668, Merck is the world's oldest pharmaceutical and chemical company. The founding family remains the majority owner of the publicly listed corporate group. Merck holds the global rights to the Merck name and brand. The only exceptions are the United States and Canada, where the company operates as EMD Serono, MilliporeSigma and EMD Performance Materials.

Institute for Large Area Microelectronics (IGM), University of Stuttgart: Since it was founded as "Laboratory for Display Technology" in 1991 the IGM has widened its research scope constantly. Besides thin film transistors (TFTs) based on amorphous and polycrystalline silicon, carbon nano tubes, IGZO, and organic semiconductors its area of research includes flexible LC- and OLED-Displays on metal- or plastic-foils, printed electronics, display drivers and optical signal processing, especially methods to synthesize optical filters. Due to its Europe-wide unique equipment and expertise all process steps from creating photolithographic masks to actuated active matrix displays can be performed directly at the IGM.

Dr. Ing. h.c. F. Porsche AG: Dr. Ing. h.c. F. Porsche AG based in Stuttgart-Zuffenhausen, Germany, is the world's leading manufacturer of exclusive sportscars. In 2016, the company delivered around 237,000 new vehicles to its customers around the world, generating sales of



EUR 22.3 billion. The company's operating income sat at EUR 3.9 billion, making Porsche one of the world's most profitable automotive manufacturers. Porsche founded the sportscar segment more than 50 years ago with the release of the iconic 911 sportscar. Further model lines have since followed in the form of the 718 Boxster, 718 Cayman, Panamera, Macan, Cayenne and 918 Spyder. Porsche is also setting milestones when it comes to plug-in hybrid drives: Porsche was the first manufacturer to introduce this technology in high-performance sportscars (918 Spyder), exclusive saloons (Panamera S E-Hybrid) and premium off-road vehicles (Cayenne S E-Hybrid). What's more, with the tests on the 919 Hybrid prototype, Porsche is already achieving success working on the technology of tomorrow in the LMP1 class of the World Endurance Championship (WEC). This technology is also set to be used in the first purely electric series-production sportscar that will be launched by the end of the decade in the form of the "Mission E". In total, Porsche AG employs a staff of around 28,000 across the globe through 70 subsidiaries. Production facilities have been established in Zuffenhausen (for the 911, 718) and Leipzig (for the Panamera, Macan and Cayenne). The development, design and motorsports departments are based in the Development Centre in Weissach, Germany.

Elmos Semiconductor AG: Elmos develops, produces and markets semiconductors and sensors, primarily for use in the automotive industry. Our components communicate, measure, regulate and control safety, comfort, powertrain and network functions. For over 30 years, Elmos innovations have been bringing new functions to life and making mobility worldwide safer, more comfortable and more energy efficient. Elmos achieved sales of 228.6 million euro in the past financial year. Headquartered in Dortmund, the company employs more than 1,100 people worldwide. Other locations are located e.g. in Detroit, Silicon Valley, Shanghai and Tokyo. The company is listed on the Prime Standard on the Frankfurt Stock Exchange.

Schweizer Electronic AG: Schweizer Electronic AG stands for state-of-the-art technology and consultancy competence. SCHWEIZER's premium printed circuit boards and innovative solutions and services for automotive, solar, industry and aviation electronics address key challenges in the areas of Power Electronics, Embedding and System Cost Reduction. Its products are distinguished for their superior quality and their energy-saving and environmentally friendly features. Together with its partners WUS Printed Circuit (Kunshan) Co., Ltd., Meiko Electronics Co. Ltd. and Elekonta Marek GmbH & Co. KG the company offers in its division electronics cost- and production-optimised solutions for small, medium and large series. Together with its partner Infineon Technologies AG, SCHWEIZER plans to jointly tap the chip embedding market in future. With 787 employees SCHWEIZER achieved sales of 116.1 million euro in Fiscal Year 2016. The company was founded in 1849, is managed by the family and listed at the Stuttgart and Frankfurt Stock Exchanges (ticker symbol „SCE“, „ISIN DE 000515623“).

Universität Paderborn: Paderborn University is the University for the Information Society. Our strong foundation in computer science and its applications, as well as the importance of IT for a growing number of disciplines, are the pillars for this claim. But we want to achieve more: we want to contribute to the scientific and technical development of the information society, simultaneously critically reflecting these developments by taking into account the history, norms and values of our society. To achieve this, we need the spectrum from "hard" sciences to the arts and humanities to complement and learn from each other. Our mission includes a strong international and cultural presence, since the information society is decidedly global and should not remain a purely intellectual undertaking. Our university orchestra, our drama group, and

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more than 70 different sports, are some of the important university activities that help characterize academic life here in Paderborn. Our five faculties cover a broad range of courses of study in the arts and humanities, business studies, natural sciences, and engineering. We offer 63 degree programs at bachelor and master level. Additionally, teacher education programs play an important role in Paderborn. With over 20,300 students, 247 professors and a library that is open 350 days a year, our compact campus university provides a friendly, green, connected environment with excellent services for student life.

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