Mercedes-Benz

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Mercedes-Benz Brings Future Technologies to Life: Innovative Display Solutions and Intelligent High-Voltage Technology in Focus

- **Intelligent Display in Glass: vehicle communicates with surroundings using LED technology**
- **Innovative Holo Display: windshield becomes a personalized communication surface**
- **Pioneering Power Converter: 800-volt-capable technology with up to 3 kW output and AC charging functionality**

Atlanta. Innovation has been at the heart of the Mercedes-Benz DNA for 140 years. With new ideas and technologies, the company is continuously shaping automotive progress. The aim of every innovation is to offer customers genuine added value. An exclusive insight into current research and development projects underlines this ambition. The technologies contribute to the characteristic Mercedes-Benz "Welcome Home" feeling, helping to make the vehicle even safer and more personal, information even more intuitive and the high-voltage system more efficient.

"The future of mobility is not created through promises, but through precision and proven engineering excellence. With innovations that offer clear benefits in our customers' everyday lives, we are shaping the mobility of tomorrow – continuously, consistently and with a clear focus on the future."

Ida Wolf, Vice President Development Innovations, Operations & Digitalization, Mercedes-Benz AG

Intelligent display technology for communication and potential safety applications

Safety is an essential part of the Mercedes-Benz DNA. The company is currently working on innovative display technologies that explore new forms of communication between the vehicle and its surroundings. In the current development application, LED display elements can be integrated directly into the vehicle windows. Potential future applications could include warning symbols or traffic-related information selectively displayed in the rear window. When no content is displayed, the display elements laminated into the glass composite remain almost invisible, blending harmoniously into the vehicle design.

Two specialized LED technologies are being explored for different potential applications. Mini LEDs are particularly suitable for larger display areas such as the rear window. They could be used, among other things, to show brake lights, warning symbols or traffic information for the road users behind. Micro LEDs, meanwhile, offer high resolution and are therefore especially suited to sophisticated visual

displays on smaller display areas, such as animations. Both features follow the logic that content appears only when needed and otherwise remains virtually invisible.

Holographic Display: the windshield becomes an on-demand communication surface

Mercedes-Benz is rethinking display surfaces. Instead of conventional screens, previously unused areas in the vehicle are being examined as potential information surfaces. The company is working on a holographic display concept that explores how areas of the windshield could serve as information surfaces. A projector in the instrument panel projects content onto the windshield. A special transparent film laminated into the glass uses “holographic optical elements” (HOE) to selectively reflect the wavelengths of light emitted by the projector. This technology concentrates the light in such a way that the image remains visible even in sunlight. It is also visible only from specific viewing angles: the driver therefore cannot see what is shown on the passenger side – and vice versa. This opens additional information possibilities, such as displaying context for POIs (points of interest), driving information or films. The new display is not permanently visible but shows content only when needed. This means the windshield can be used situationally for navigation, video calls, or driving information without permanently changing the vehicle’s appearance.

Innovative Power Converter: new perspectives for electric drive systems with currently up to 3 kW output for 800-volt applications

The Mercedes-Benz Power Converter is a technology currently under development for potential future electric vehicles that uses programmable micro-converters to control the energy flows of individual battery cells and provides a constant high-voltage output of up to 800 volts, regardless of the cells’ state of charge or ageing. This could enable batteries and power electronics to be designed with significantly greater flexibility, efficiency and compactness in the future, while also supporting functions such as AC and DC conversion and bidirectional charging. The current generation already delivers up to 3 kW of power and supports AC and DC applications.

The Power Converter thus opens new possibilities for the design of electric drive systems and charging functions in electric vehicles. The technology makes it possible to largely decouple the provision of the required high voltage from the battery architecture and instead generate it through software-controlled power electronics.

A particularly promising prospect is the modular use of the technology directly at the level of individual battery cells or cell groups. Multiple Power Converters connected in parallel regulate the energy flows individually and jointly provide a stable high-voltage DC output. This allows the overall power output to be flexibly adapted to different vehicle and system requirements. At the same time, the high-voltage output is no longer directly determined by the number of battery cells connected in series, but instead by the decentralized converters and their software-based control.

In future vehicle architectures, the Power Converter could combine several functions that are currently handled separately into a single hardware unit. The technology could therefore provide greater flexibility in the future design of batteries and powertrains. It could contribute to greater system efficiency and facilitate more modular powertrain architectures for battery-electric vehicles and plug-in hybrids.

The technologies presented are currently under development and are not customer-facing features or announcements of series-production applications. They demonstrate potential future approaches to vehicle communication, information display and high-voltage system design.

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Mercedes-Benz Anniversary Year “140 Years of Innovation”
Since Carl Benz filed the patent for the first automobile 140 years ago and Gottlieb Daimler built his motorized carriage shortly afterwards, Mercedes-Benz has dedicated itself to constant innovation and to creating the world’s most desirable cars for customers. This ambition has driven every innovation – from the world's first automobile in 1886 to the biggest product launch program in the company’s history that is currently underway. With its passion for performance and pioneering power, excellence and an unwavering commitment to customer service, the brand has consistently shaped the future of mobility. The result goes well beyond engineering achievement – it creates the unmistakable feeling that leads through everything Mercedes-Benz does: Welcome home.

Mercedes-Benz is celebrating 140 years of innovation: Three new S-Class sedans went on a trans-continental journey to 140 locations worldwide as part of the “140 Years. 140 Places” tour. Each place highlighted the brand’s technology, heritage, pioneering spirit and worldwide presence. Along the way, customers, fans and colleagues got to join in the celebrations right up to its grand ‘Homecoming’ finale at the Mercedes-Benz Museum. Highlights of the tour can be found on our “140 Years of Innovation | Mercedes-Benz Media” special.

About Mercedes-Benz Research & Development North America (MBRDNA)
As a U.S.-based research and development subsidiary of Mercedes-Benz established in 1994, Mercedes-Benz Research & Development North America (MBRDNA) is responsible for the development of advanced technologies spanning autonomous driving, electric vehicles, connected car solutions, and software development, among other areas of focus. MBRDNA employs developers, technicians, engineers, and designers who collaborate closely with Mercedes-Benz HQ in Germany as well as R&D facilities around the globe.

Learn more about current topics and events related to MBRDNA on our Mercedes-Benz Research & Development North America LinkedIn channel at https://www.linkedin.com/company/mbrdna/.

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