

## Eliminating Emissions DLR at IAA Mobility 2023

Nummer

Datum

31 August 2023

Sperrfrist

Seite

1

The world's most environmentally friendly car in operation, unique test infrastructure for the development of autonomous driving and new ideas for connected mobility will be displayed by the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) at IAA Mobility 2023 in Munich. The focus of the presentation in Munich city centre as part of the Open Space (Odeonsplatz, Stand OP320) from 5 to 10 September 2023 will be the prototype Zero Emission Drive Unit Generation 1 (ZEDU-1). It is the world's most environmentally friendly road vehicle in operation. This is because the electric car also reduces emissions of particulate matter and microplastics caused by the abrasion of brakes and tyres to the greatest possible extent. In addition, the DLR team will provide an insight into the research operation of the futuristic U-Shift vehicle concept, which is taking place at the National Garden Show in Mannheim until 8 October 2023.

In the exhibition halls at the IAA Summit from 5 to 8 September 2023, DLR (Hall A2, Stand D32) will be presenting the Test Bed Lower Saxony – a research and development platform for testing technologies for automated and networked driving. The Networked Mobility for Liveable Places (VMo4Orte) project will also be present. This shows ideas and approaches to solutions on how to travel in the city of tomorrow in a climate-friendly, efficient and demand-oriented way.

"For the foreseeable future, road vehicles will remain the dominant mode of transport. This is why DLR is developing practical technologies and demonstrating innovative solutions to make the entire transport system, and thus the mobility of the future, climate

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and environment compatible. A key aspect here is also the integration of road traffic into the transport system. At the same time, it must be efficient, safe and comfortable, oriented towards people's needs and ensure the participation of all social groups. With the ZEDU-1 prototype, we will be demonstrating our vision of almost zero-emission driving at IAA Mobility 2023. This is a successful example of what DLR's research and innovation experience, combined with the expertise of our corporate partners, can achieve for Germany as an automotive location," emphasises Anke Kaysser-Pyzalla, Chair of the DLR Executive Board. With its transport research, DLR is one of the largest institutionally funded transport research facilities in Europe.

### **New and live in a podcast – DLR researchers on the mobility of the future**

In cooperation with DLR, podcaster Daniel Finger will be talking about fascinating research topics in the series 'Von der Erde ins All' (From Earth to Space) from 5 to 7 September 2023. The podcast will also be live on the DLR stand at the IAA Mobility Open Space – for everyone to watch and listen. DLR transport research scientists will be there with current projects and assessments (see programme below). A selection of the best discussions will be available for listening on all common podcast platforms after the broadcast.

### **The ZEDU-1 prototype – emission-free travel without particulate matter and microplastics**

The ZEDU-1 project focuses on those components that produce emissions but have received little attention so far, namely brakes and tyres. With its vehicle prototype, developed together with the automotive company HWA, DLR is demonstrating practical solutions for making future road travel almost emission-free. Instead of a conventional disc brake, the vehicle has a multi-disc brake. This is

Nummer

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Seite

2

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not built into the wheel but is integrated into the electric motor as a closed unit. Thanks to the especially developed high-performance electronics, the braking energy is almost completely recovered. The researchers used the freed-up space for another innovation – the closed wheel housing of the ZEDU-1. It is aerodynamically designed in such a way that negative pressure is created when driving. The tyre abrasion products thus accumulate in a specific place. A fan unit in the front of the vehicle extracts the particles and sends them through a filter system – similar to a vacuum cleaner. This way, only cleaned air exits the vehicle.

The ZEDU concept is highly efficient, extremely compact, suitable for everyday use and versatile. It can be directly transferred to future passenger cars and commercial vehicles. During initial test drives, no tyre abrasion was emitted into the environment at a speed of 50 kilometres per hour. At higher speeds, this was reduced by 70 to 80 percent compared to conventional road vehicles.

### **Experience the Test Bed Lower Saxony and networked mobility digitally**

On the DLR stand at the IAA Summit, current research will be available for visitors to experience directly – using augmented and virtual reality glasses. The focus will be on the Test Bed Lower Saxony and the Networked Mobility for Liveable Places (VMo4Orte) project.

With the Test Bed Lower Saxony, DLR has a unique research platform for developing and testing technologies for automated and networked driving, together with partners from industry and scientific research. Using augmented reality glasses, visitors to the DLR stand can gain a live insight into the 280-kilometre-long test field, whose cameras and sensors produce more data than any other test field in the world. The researchers also use augmented reality to

Nummer

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Sperrfrist

Seite

3

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visually display these huge amounts of data. The collection, processing, evaluation and transfer of data into a digital image of the test field is an important research focus at DLR. This is the only way to produce reliable research results that will advance the approval of highly automated driving functions.

What mobility will look like in the city of the future is shown by a virtual reality application created as part of the Networked Mobility for Liveable Places (VMo4Orte) project. In this project, DLR scientists are developing ideas and approaches to solutions on how to travel in the city of tomorrow in a way that is climate and environmentally compatible, demand-oriented, efficient and at the same time close to the needs of local people. These findings contribute to the transformation of the transport system and mobility behaviour as well as interdisciplinary expertise for implementation.

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Nummer

Datum

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Sperrfrist

Seite

4

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