Automation, software, electromobility

DLR at IAA Mobility 2025

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The German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) is showcasing its latest transport research projects at IAA Mobility in Munich. This year's focus centres on technologies, concepts and expertise for shaping the mobility of the future – testing solutions under realistic conditions and ensuring safe operation.

At the IAA Summit for trade visitors (Trade Fair Center Messe München, Hall A1, Stand B30) from 9 to 12 September 2025, DLR will present a remote operation workplace for the technical supervision of autonomous vehicles, as well as a mobile measurement infrastructure from a test field in Lower Saxony for automated and connected driving. Other exhibits will demonstrate how software updates for vehicles can be safely implemented during operation and how a tool analyses the charging requirements of electric vehicles to support the targeted expansion of charging infrastructure.

DLR will also be present at the publicly accessible IAA Open Space in Munich city centre (Odeonsplatz, OP320). From 9 to 14 September 2025, a robotically controlled off-road vehicle will be on display there. The vehicle is designed to be remotely operated through disaster and crisis areas. Visitors can also use VR headsets to explore how lightweight electric vehicles could make mobility more sustainable and flexible.

“Through its innovative and market-oriented technologies, data-based methods and digital solutions, DLR's transport research is an important pioneer for the mobility of the future. We provide crucial

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knowledge for action to inform social and political decision-making and, through our practical test infrastructure we support the rapid transfer of technologies into commercially successful applications", says Meike Jipp, DLR Divisional Board Member for Energy and Transport.

Exhibits at the IAA Mobility Summit, Messe München (Hall A1, Stand B30)

Workstation for the remote technical supervision of autonomous vehicles

For automated driving at SAE Level 4 (**S**ociety of **A**utomotive **E**ngineers), German legislation requires technical supervision. In this case, the vehicle drives and monitors itself autonomously, and only in rare cases does such supervision intervene – which can also be carried out remotely. To support the introduction of this form of autonomous driving, DLR has developed a dedicated workplace. The focus here is on the interface between human operators who can intervene remotely when necessary and the autonomous vehicles – the **H**uman-**M**achine **I**nterface (HMI). With this 'Remote Operation Workplace', DLR stands amongst the pioneers in the field. Until now, few proposals have addressed what such workplaces should look like to comply with legislation. At the DLR stand, visitors can experience the display and operating concept of this workplace. Videos demonstrate how an autonomous vehicle receives support in obstacle avoidance. DLR's work in the field of technical supervision as tele-assistance support the implementation of autonomous driving in Germany and the development of corresponding operating concepts.

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Lower Saxony Test Field – camera-based traffic monitoring and AI evaluation

The Lower Saxony Test Field provides DLR with a unique research platform for developing and testing automated and connected driving on the road, in collaboration with industry and academia. The DLR stand will feature components of the test field infrastructure, particularly a mobile measuring station housed in a trailer with an extendable camera mast. Two monitors will display selected traffic situations of research interest, alongside application projects that exploit the test field. The system also incorporates artificial intelligence (AI) – for example, to evaluate traffic scenarios. With the findings from the Lower Saxony Test Field, DLR is working to advance the digitalisation of roads, thereby increasing safety and efficiency. At the same time, it is supporting the automotive industry in further developing and validating autonomous driving functions.

Secure updates for future software-defined vehicles

Whether for autonomous driving, customisable functions or new mobility services, vehicles are increasingly becoming 'computers on wheels'. Software plays an ever-greater role in this evolution and requires regular updates. Errors in the update process can lead to substantial costs and recalls. In the future, if updates are to be performed while an autonomous vehicle is in operation, the demands will be even greater: the updates must be guaranteed to work safely and be executed at the right time. DLR is therefore developing a specialised update process: an update management system first checks whether the vehicle's computing platform has all the necessary resources for the update – for example, whether sufficient computing power and storage space are available. If these conditions are met, the new function is transferred to the vehicle's computing platform and installed. Following successful testing, the function is then ready to be activated. DLR is showcasing this in the

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'AMDEV-Bed' exhibit (**A**utomotive **M**odel **D**emonstration **E**valuation and **V**erification Bed). This development and demonstration environment consists of a 1:10 scale model vehicle that runs on a rolling test stand, connected to a simulation environment. Through this work, DLR is helping vehicle manufacturers and suppliers of software components to facilitate integration and testing.

PowerForecastMapper – expanding charging infrastructure to meet demand

The expansion of electric mobility requires a powerful and comprehensive charging infrastructure. To achieve this, it is necessary to know where charging stations make the most sense. The challenge lies in the fact that charging demand will increase at different rates depending on location and time, and grid connection capacities will need to be adapted accordingly. At the same time, coupling the transport and energy sectors offers opportunities to create additional flexibility – for example, through delayed charging or feeding electricity that is temporarily not needed by vehicles back into the grid. With its **P**ower**F**orecast**M**apper (PFM), DLR is carrying out a detailed investigation, by time and location, of the charging requirements of passenger and freight transport on the road and in local rail transport. Depending on how heavily existing infrastructure is used, the PFM identifies possible locations and configurations for charging points. The tool also analyses interactions with the energy system.

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Remote control through difficult situations with teleoperation

DLR is working with partners such as the United Nations World Food Programme (WFP) to develop and test technologies and expertise for remotely operated off-road vehicles. These vehicles can access areas that are difficult to reach in disaster and crisis situations, or places that are too dangerous for humans. At Odeonsplatz, DLR is showcasing how this remote control works: in the AHEAD project (**A**utonomous **H**umanitarian **E**mergency **A**id **D**evices), the vehicle is equipped with sensors for real-time monitoring of its surroundings, with its remote operation already tested in live trials. To control the vehicle remotely, an operator sits at a remote operations control station. Since the vehicle behaves very differently from a conventional road vehicle, the station uses telerobotics technologies from space research. Several technologies are interlinked for route planning, data exchange and communication – mobile networks, satellite communication, broadband internet and radio. For further insights, DLR is also presenting the AHEAD project at the Bavarian Ministry of Economic Affairs, Regional Development and Energy's stand at the IAA Mobility Summit (Hall B2, Stand B11).

Exploring with VR – light electric vehicles for more sustainable mobility

With another Open Space exhibit, DLR is demonstrating how immersive technologies can be used in research into more sustainable vehicle concepts. With a VR headset, virtual vehicles can be designed interactively and according to specific requirements. Visitors can watch live on screen as a DLR prototype is adapted and visualised in real time in terms of seat numbers, technical

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characteristics, design and equipment. For manufacturers, fleet operators and mobility managers, this approach combines the simple digital collection of requirements with immersive, playful elements from gaming. **L**ight **e**lectric **v**ehicles (LEVs) have the potential to reduce the climate impact of the transport sector, change mobility behaviour and advance electric mobility. Because of their lower weight and smaller dimensions, LEVs require smaller batteries, which in turn use fewer raw materials in production and cause lower climate-damaging emissions.

DLR at the German Federal Ministry of Transport (BMV) – Königsplatz, Stand KP180

IMoGer – autonomous and flexible travel for the 'last mile'

Through the IMoGer (**I**nnovative modular **Mo**bility made In **Ger**many) research project, DLR is participating at the Federal Ministry of Transport's (BMV) stand. Together with partners from the mobility sector, transport industry and logistics, DLR is developing and testing a unique mobility concept that combines autonomous, flexible and demand-oriented transport of both people and goods – based on DLR's modular, electrically powered, autonomous vehicle concept, U-Shift. The concept consists of a U-shaped drive unit that can transport either passengers or goods capsules. As a holistic solution for last-mile mobility, IMoGer aims to reduce traffic loads, promote sustainability and efficiency, and prepare innovative business models for mobility services.

A multi-week trial operation is planned for 2027 in a district of Braunschweig, where several U-Shift vehicles will supplement public transport and handle courier, express and parcel deliveries. The BMV is funding the IMoGer project with approximately 35 million euros.

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A model of the U-Shift vehicle and screen exhibits will provide an insight into this work.

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