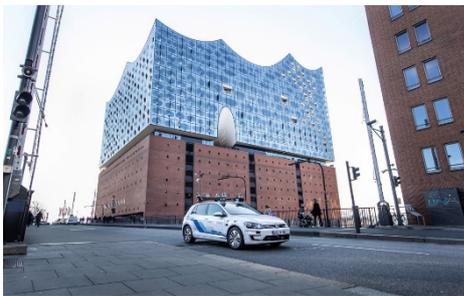

Media information

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Volkswagen tests highly-automated driving in Hamburg

- **First test drives in real driving conditions in major German city**
- **Specially equipped fleet of e-Golf¹ for automated driving to Level 4**
- **Initiative is part of the strategic mobility partnership with the Hanseatic city**
- **Axel Heinrich, Head of Group Research: “Test drives in an urban environment give us an excellent opportunity to make further progress with automated driving.”**

Hamburg/Wolfsburg, April 3, 2019 – Volkswagen Group Research is testing automated vehicles in urban traffic in Hamburg. This is the first time Volkswagen has begun to test automated driving to Level 4 at real driving conditions in a major German city. From now, a fleet of five e-Golf, equipped with laser scanners, cameras, ultrasonic sensors and radars, will drive on a three-kilometer section of the digital test bed for automated and connected driving in the Hanseatic city. The results of the test drives, which will be continuously evaluated taking full account of all data protection rules, will be incorporated in the Group’s numerous research projects on automated driving, and will test customer-centric services and optimize individual transport.



Volkswagen tests highly-automated driving in Hamburg

Axel Heinrich, Head of Volkswagen Group Research, commented: “The tests center on technical possibilities as well as urban infrastructure requirements. In order to make driving even safer and more comfortable in future, vehicles not only have to become autonomous and more intelligent – cities must also provide a digital ecosystem that enables vehicles to communicate with traffic lights and traffic management systems as well as with one another.”

A 9-kilometer digital test bed for automated and connected driving is currently being constructed in the city of Hamburg, with completion scheduled for 2020.

To that end, the Free and Hanseatic City of Hamburg is successively upgrading traffic lights with components for infrastructure-to-vehicle (I2V) and vehicle-to-infrastructure (V2I) communication. Volkswagen and the city of Hamburg are thus taking a decisive step to further optimizing traffic flows through digitalization and to full-size implementation of automated driving in the city area.

Michael Westhagemann, Hamburg's Senator for Economics, Transport and Innovation, said: "Two and a half years from now, Hamburg will be hosting the World Congress for Intelligent Transport Systems (ITS). Automated driving will play a key role. I am delighted that our strategic partner Volkswagen has already become the first user for our digital test bed. We will establish Hamburg as a model city for intelligent mobility and be presenting numerous innovative mobility projects to a global audience in 2021."

The e-Golf configured by Volkswagen Group Research has eleven laser scanners, seven radars and 14 cameras. Up to 5 gigabytes of data are communicated per minute during the regular test drives, each of which lasts several hours. Computing power equivalent to some 15 laptops is tucked away in the trunk of the e-Golf. This enormous computing capacity, combined with state-of-the-art sensor technology, ensures that data on pedestrians, cyclists, other cars, intersections, rights of way, parked vehicles and lane changes in moving traffic are captured over the shortest distances and in milliseconds. Despite the diversity and complexity of the information, the artificial intelligence used in the vehicle software must register all relevant objects and respond to them without triggering any false alarms. Several different artificial intelligence approaches are used: these include deep learning, neural networks and pattern recognition.

For safety reasons, specially trained test drivers will be seated behind the steering wheel during all test drives in Hamburg to constantly monitor all driving functions and intervene in an emergency. Furthermore, all data protection rules will be fully taken into account.

Volkswagen Group Research is collaborating with all brands and relevant Group departments to enable the functionality of automated driving on public roads – right through to Level 5. The findings of this project will be successively incorporated in further research and development initiatives. The goal is to be in a position to offer customers concrete products for the automated transport of goods and passengers on public roads a few years from now. This will contribute to lasting improvements in traffic flows and road safety. However, automated driving without a safety driver in public traffic requires changes in the legislative framework and the availability of the necessary infrastructure.

The different levels of automated driving

Level 1: Assisted driving

Example: ACC (Adaptive Cruise Control)

Level 2: Partial automation

Example: Travel Assist (combination of adaptive cruise control and lane-keep assist)

Level 3: Conditional automation

Example: Traffic Jam Assist

Level 4: High automation

Example: Park Pilot

Level 5: Full automation

Example: Fully self-driving transport

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¹⁾ Power consumption, kWh / 100 km: combined 14.1 with 17-inch wheels – 13.2 16-inch;
combined CO₂ emissions, g/km: 0; efficiency class: A+.



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About the Volkswagen Group:

The Volkswagen Group, with its headquarters in Wolfsburg, is one of the world's leading automobile manufacturers and the largest carmaker in Europe. The Group comprises twelve brands from seven European countries: Volkswagen Passenger Cars, Audi, SEAT, ŠKODA, Bentley, Bugatti, Lamborghini, Porsche, Ducati, Volkswagen Commercial Vehicles, Scania and MAN. The passenger car portfolio ranges from small cars all the way to luxury-class vehicles. Ducati offers motorcycles. In the light and heavy commercial vehicles sector, the products include ranges from pick-ups, buses and heavy trucks. Every weekday, 664,496 employees around the globe produce on average 44,567 vehicles, are involved in vehicle-related services or work in other areas of business. The Volkswagen Group sells its vehicles in 153 countries.

In 2018, the total number of vehicles supplied to customers by the Group globally was 10,831 million (2017: 10,741 million). The passenger car global market share was 12.3 per cent. In Western Europe 22.0 per cent of all new passenger cars come from the Volkswagen Group. Group sales revenue in 2018 totalled €235.8 billion (2017: €231 billion). Earnings after tax in 2017 amounted to €17.1 billion (2017: €11.6 billion).
