

Autonomous Future Bus completes milestone journey

Daimler Buses announced on Monday that the Mercedes-Benz Future Bus with CityPilot has driven autonomously for the first time on a route of approximately 20 kilometers in Amsterdam.



On a section of the longest bus rapid transit (BRT) line in Europe, the bus drives at speeds up to 70 km/h, stops to the nearest centimetre at bus stops and traffic lights, drives off again automatically, passes through tunnels, brakes for obstacles or pedestrians and communicates with traffic signals. The driver is on board and monitors the system, but with a much easier task than before. Daimler Buses is the world's first manufacturer to put a city bus into automated operation in a real-life traffic situation.

Intelligent tech

The first step towards fully automated driving with buses in urban traffic consists of BRT lines with separate lanes. The Future Bus recognises whether the route is suitable for automated driving and informs the driver accordingly. The bus driver then presses a button and CityPilot is activated. One condition is that the driver does not press the accelerator or brake pedal and does not steer, because any driver activity overrules CityPilot - the driver is always in charge of driving and can take over at any time.

CityPilot comprises current assistance systems, those used in Mercedes-Benz coaches for example, as well as additional systems, some of which have been taken over from Daimler Trucks and further developed for urban traffic. The equipment includes long- and short-range radar, a large number of cameras and the satellite-controlled GPS navigation system. The intelligent connectivity of the cameras and sensors allows a precise picture of the surroundings and the exact position of the bus.



Take Amsterdam as an example: signals from special traffic lights ahead of the bus. Two red lights next to each other mean stop, two white lights one above the other mean go ahead. The white lights come on and the bus starts gently and follows its lane. CityPilot recognises the traffic lights with its sophisticated camera system. In addition, the vehicle communicates via Wi-Fi with the route infrastructure, receiving information on traffic-light status. This means that the bus can take advantage of a 'green wave' of traffic lights. Two bridges, a tunnel. The bus safely stays in its lane.

After leaving the built-up area, it accelerates to the allowed 70 km/h. The maximum speed is programmed; even at this speed the driver does not steer. The bus arrives at the bus stop in automated mode. It stops, opens and closes the doors, and drives away again. Red lights ahead; the bus independently brakes gently and comes to a standstill safely. While the lights are changing, pedestrians are still crossing the road. The bus waits, lets them cross, and does not drive away until the road is clear. In order to avoid a collision, CityPilot has an automatic braking system that decelerates the vehicles as required.

Owing to its anticipatory driving style, the bus enhances road safety, improves efficiency, puts less stress on the engine and reduces fuel consumption and emissions.



Design

The roughly twelve metre long solo bus appeals with an asymmetrical and modern exterior design. The interior is open and light. The completely low-floor bus is divided into three areas: The 'service' area is at the front near the driver; the 'express' area for short journeys with a focus on standing room and quick passenger flow is in the middle. Behind that is a 'lounge' area where passengers spend more time. Their smartphones can be charged wirelessly, inductively that is.

The redesigned cockpit is an integrated part of the whole space. The driver receives the required information on a large display in an innovative presentation style, and can concentrate fully on his or her core tasks. The electronic ticket system, an important element of the vehicle's connectivity, dispenses with the conventional selling and checking of tickets by the driver.

Future generations of city buses

With this technology, Daimler Buses is following the development path of Daimler Trucks, which will bring Highway Pilot to series maturity by the end of the decade. Daimler Buses will develop bus-specific aspects of the CityPilot system towards series application independently - like driving to and away from bus stops.

The Mercedes-Benz Future Bus with CityPilot as a technology carrier will supply Daimler Buses with findings for this

systematic further development of the city bus of the future. That will focus on emission-free drive systems, the further development of driver-assistance systems and the partial automation of driving functions (given the appropriate legal framework), the connectivity of bus and infrastructure such as BRT operating systems, and the electric/electronic architecture.

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