Toyota Research Institute Rolls Out New Lexus LS-Based P4 Automated Driving Test Vehicle at CES

4 January 2019

The Toyota Research Institute will introduce its new TRI-P4 automated driving test vehicle next Monday (7 January) at CES – the Consumer Electronics Show – in Las Vegas. The P4 is based on the new, fifth generation Lexus LS flagship saloon and will be used by TRI in the development of its twin-track Guardian and Chauffeur automated driving systems.

Ryan Eustice, Senior Vice President of Automated Driving at TRI, explained: "Our Chauffeur development is focused on full autonomy, where the human is essentially removed from the driving equation, either completely in all environments, or within a restricted driving domain.

"On the other hand, Guardian is being designed to amplify human performance behind the wheel, not replace it. The introduction of the new P4 platform this spring will help us accelerate the development of both tracks."

The P4 benefits from Lexus's new generation of chassis and steering control technology, which provides greater agility and allows for more responsive and smooth manoeuvres during automated driving. It makes use of two additional cameras to improve situational awareness to either side. There are also two new imaging sensors – one facing forward and one pointed to the rear – specifically designed for use on automated vehicles and featuring new chip technology with high dynamic range. The radar system has been optimised to improve the field of vision, especially for close range detection around the vehicle perimeter. The LIDAR sensing system with eight scanning heads has been carried over from the previous test model, Platform 3.0, has been integrated into the new vehicle design.

P4 is a much smarter research vehicle than its predecessor. With greater computing power, its systems can operate more machine learning algorithms in parallel for more rapid learning. It can process sensor inputs faster and react more quickly to the surrounding environment. All computing system power is drawn from the vehicle's hybrid battery, with the 12v battery now serving only as a back-up resource.

The brain of the automated driving system is a computing box unit in the boot. This has been re-thought and located vertically against the rear seat transom so that the full floor of the boot is free for cargo.

TRI again commissioned CALTY Design Research, based in Ann Arbor, Michigan, to style the new test

vehicle.

"We took a holistic approach to integrating autonomous componentry into the design of the new LS and the result is a fluid surface, embracing advanced technology, loosely inspired by science fiction in the graphic separations between form and function," said Scott Ridler, Senior Lead Designer at CALTY Design Research.

The Toyota Motor North America (TMNA) R&D Development Center in York, Michigan, will begin fabricating P4 vehicles from stock LS vehicles this spring. P4 will make its public debut during Toyota's CES press conference at 1pm local time (9pm GMT) on 7 January. As part of the event, TRI CEO Dr Gill Pratt will present details of recent technological advances in Guardian automated driving.

The P4 will also form part of the Lexus exhibit at the North American International Auto Show in Detroit on 14 and 15 January.

You can find more images of the Lexus LS-based TRI P4 test vehicle [here.](#)

ENDS