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Hitachi Astemo develops “Dynamics Planning” A high-precision vehicle trajectory planning technology that improves cabin comfort in autonomous driving

Tokyo, May 25, 2021 --- Hitachi Astemo, Ltd. has developed “Dynamics Planning,” a highly precise vehicle trajectory planning technology for AD ECU[*1]. The technology uses an algorithm to control unpleasant sway and acceleration in Level 3 vehicles and promotes a comfortable driving experience.

The development of automated vehicle technology is not only about getting the vehicle to its intended destination without driver control, but getting there safely, comfortably, and quickly. Comfort in the vehicle becomes particularly important as the level of automation increases, freeing the driver from the controls.

Currently, a skilled driver is required to make effective use of lane width and speed to create a gentle trajectory and smooth changes in acceleration when driving around bends. This helps to keep the cabin comfortable and reduces unpleasantness from irregular acceleration and sway. However, today’s conventional advanced driver assistance technologies do not replicate a skilled driver. The vehicle instead attempts to travel at a constant speed along a path close to the center of the lane, causing an unpleasant sway.

Dynamics Planning, developed by Hitachi Astemo, is an algorithm for achieving a path and speed that keeps the vehicle interior comfortable as though a skilled driver aided by autonomous driving and driving with advanced driver assistance technologies is at the wheel. In Dynamics Planning, data is gathered by sensors such as cameras, map data utilizing MPU[*2], and in the future will incorporate traffic information from infrastructure data. Data of the drivable area is input into the AD ECU where it effectively utilizes lane width to draw a curve as gentle as possible, and a track that limits change in acceleration is applied and to a trajectory plan ensuring that the changes are gentle.

Today’s method of trajectory planning requires AD ECUs to have a high degree of computing power due to complex calculations that are reliant upon vehicle characteristics such as vehicle weight and length. Additionally, the vehicle may not run

comfortably if there are unintended disturbance factors such as strong winds or unevenness of the road surface. The algorithms in Hitachi Astemo's Dynamics Planning enable a simple trajectory plan that instead uses its proprietary vehicle control technology*3 to manage vehicle specifications and potential disturbance factors, and not vehicle specifications.

An autonomous vehicle driving on a targeted trajectory calculated by Dynamics Planning will be able to drive comfortably without unpleasant swaying just as if driven by a skilled driver.

Hitachi Astemo will present this technology at the spring meeting of the Society of Automotive Engineers of Japan which will be held online from May 26th (Wednesday) to May 28th (Friday).

By providing advanced mobility solutions that improve safety and comfort as well as enhance environmental protection, Hitachi Astemo will increase social, environmental, and economic value to realize a sustainable society, contribute to improved quality of life, and enhance corporate value.

*1. AD ECU: Autonomous Driving Electronic Control Unit

*2. MPU: Map Position Unit

*3. See Hitachi news release: https://www.hitachi.com/New/cnews/month/2019/10/191011a.html

About Hitachi Astemo, Ltd.

Headquartered in Tokyo, Japan, Hitachi Astemo is a joint venture between Hitachi, Ltd. and Honda Motor Co. Hitachi Astemo is a technology company that develops, manufactures, sells and services automotive and transportation components, as well as industrial machinery and systems. For more information, visit the company's website at https://www.hitachiastemo.com/en/

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Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
