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PRESS RELEASE

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Ricardo develops technology to avoid motion sickness in autonomous vehicles

With a widespread public expectation that autonomous vehicles will offer comfort levels approaching those of a living room environment, Ricardo is developing new technology to minimize the risks of motion sickness, which promises benefits too for conventionally-driven vehicles

The imminent introduction of connected and autonomous vehicles (CAVs) has brought a widespread consumer expectation of a travelling experience offering a high level of comfort in which passengers will be able to work, read from a screen, watch a movie or hold a conversation while in motion, perhaps while seated in a swivelled, side- or rear-facing position. All these can be trigger factors for kinetosis (motion sickness), so providing technological solutions to solve this issue is likely to be crucial for consumer acceptance of CAVs.

Kinetosis, in general, is believed to be the result of dissonance between senses, caused by a disconnect between the motion as experienced by the inner ear and what the eyes are perceiving – a vestibular-visual mismatch. The classic Treisman's hypothesis suggests that such a disconnect mimics the hallucinatory effects of severe food poisoning. This effect can be compounded by the peripheral vision flicker experienced as a result of the vehicle's motion by those reading, watching screens or engaged in direct, face-to-face conversations. Children and teenagers are thought to

suffer the most from kinetosis since development of the central nervous system tends to lag behind physical growth, giving an even greater vestibular-visual mismatch.

A Ricardo Innovations research team has been investigating the causes and exacerbating factors for kinetosis and is using this to develop algorithms that can be used to improve ride comfort and avoid motion sickness. For all vehicles, the software would be advantageous in informing the optimal specification of suspension to provide the most desirable ride and handling characteristics. Additionally, for autonomous vehicles, the algorithms could be used with the real-time adaptation of multiple sensory aspects of the cabin environment – control of temperature, lighting and scent – as well as influencing the discretionary path taken in manoeuvres such as cornering, stopping, starting and overtaking.

Testing has already been carried out using adult volunteers to help calibrate the kinetosis algorithms, but further data is needed for 4 to 18 year-olds, the cohort likely to benefit most from this technology. To this end, the Ricardo team is working with UK university partners in a larger-scale research programme involving the participation of local schoolchildren –carefully monitored, of course, in accordance with stringent ethical and safeguarding standards. The project, the results of which are expected to be available for algorithm validation later this year, will be tied to the science curriculum and has been greeted with enthusiasm by teachers. As well being important in the development of autonomous vehicle control systems, the data obtained will also be extremely valuable in validating the kinetosis algorithms for application in new vehicle design.

This very promising Ricardo technology is already attracting serious interest from OEMs developing both autonomous cars and conventional premium vehicles, and from those developing mobility-as-a-service products. As such, it could transform the way that we travel in the future, making journeys – whether piloted by a human driver or autonomous vehicle control system – more comfortable and less prone to motion sickness.

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NOTES TO EDITORS:

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