Effects of External HMI of Automated Driving Truck
in Operational Design Domain on Acceptance of Peripheral Driver

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　The implementation of automated driving technology is considered to be one of the solutions to the problem of driver shortage in the logistics industry, and securing the acceptance of peripheral drivers is important for its spread. To improve the acceptance and safety of peripheral drivers when the automated truck drives in an Operational Design Domain (ODD), we proposed an external Human Machine Interface (eHMI) for automated truck driving (equivalent to Level 4) and a Variable Message Sign (VMS) on infrastructure as shown in Fig.1. we examined the effects of the eHMI and VMS of automated truck driving in the ODD on the acceptability of peripheral drivers. Twenty men and twenty women with driving licenses in Japan participated in the experiment. Experimental contents, which were approved by a committee from the Office for Life Science Research Ethics and Safety of the University of Tokyo, were explained to the participants. The experiment was performed after written informed consent was provided from the participants. Visual behaviors, subjective evaluations, and driving performance of peripheral drivers were investigated in a scene where drivers encounter a truck at a junction using a driving simulator. As a result, the visual reaction time in the case with the eHMI was lower than that in the case without the eHMI as shown in Fig.3. In addition, subjective evaluation values related to driving difficulty and safety were improved by the eHMI as shown in Fig.4. This suggests that the eHMI on the automated truck side can be effective in improving the safety and acceptability of peripheral drivers. In future works, to further improve the safety and acceptability of the automated truck, we plan to investigate the types of information and the effects of the amount of information on the eHMI and VMS.
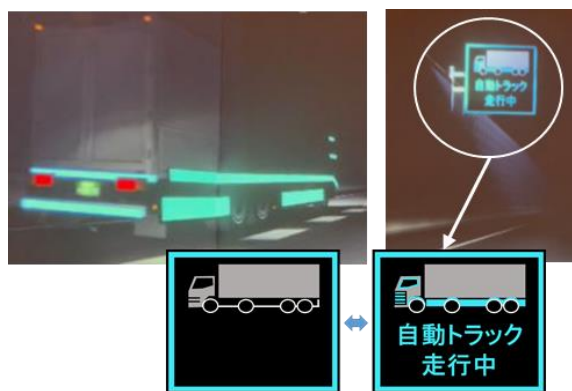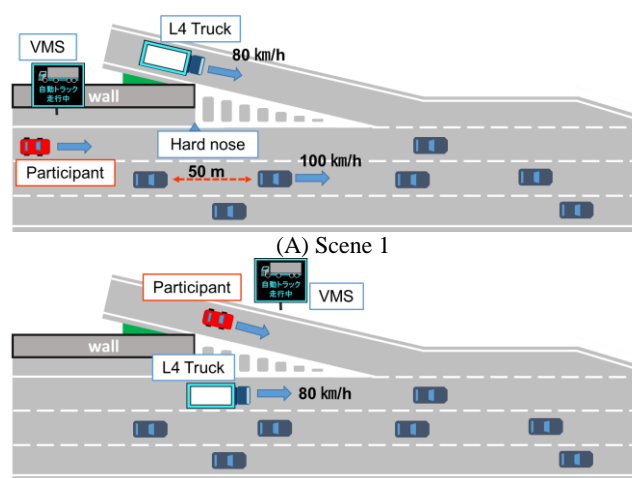
Fig.1 A view of eHMI and VMS

(A) Scene 1

(B) Scene 2
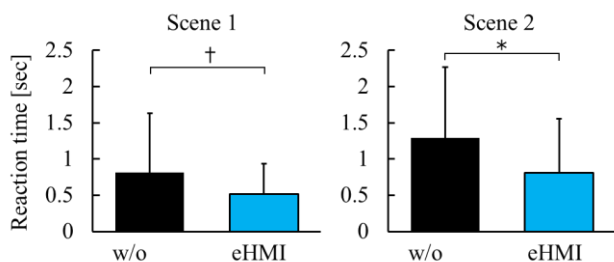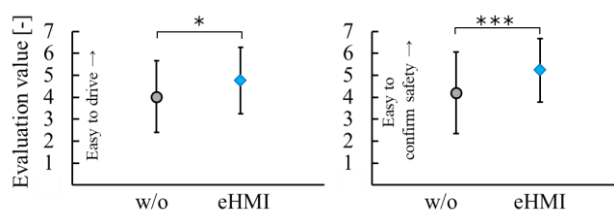
Fig.2 Experimental scene

Fig.3 Visual reaction time

Fig.4 Subjective evaluation values in case of scene 2