

## Automated Train Operation in Japan and Corresponding to Information Technologies.

Takeshi Mizuma<sup>1</sup>\* and Toshihiro Takeuchi<sup>2</sup>

<sup>1</sup> Department of Advanced Energy, Graduate School of Frontier Sciences, The University of Tokyo, Japan <sup>2</sup>National Traffic safety and Environment Laboratory, Japan \*Corresponding author, E-mail: mizuma@edu.k.u-tokyo.ac.jp

## Abstract

As though autonomous driving is developing now on automobile field, automated train operation was preceding on railway field. In Japan, the first automated train operation (Unattended Train Operation) started in 1981 in Kobe and Osaka as the new urban guided transport. Now, autonomous driving is progressing rapidly with the advance of sensor technologies and information technologies (IT). However, standardization and safety concept of automated train operation is arranged clearly on railway field because of long history through international discussions. In this paper, we express the history and trend of automated train operation on railway in Japan and Europe. Moreover, future automated train operation technologies on railway field are stated in relation to IT on automobile field.

**Keywords:** Automated train operation, Autonomous driving, Sensor technologies, Information technologies, Safety of automated train operation