Summary of SIP-adus Project (FY2016)

Name of the project	Development of an impact assessment method for Automated Driving System on CO_2 emissions
Responsible Organization	Pacific Consultants Co., Ltd.

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Object of the Project

Because CO_2 emissions from the transportation sector accounted for approximately 17 percent of total CO_2 emissions in Japan in 2013 and most of the CO_2 emissions is generated from road transport, further reduction of CO_2 emissions from road transport is required. In such a situation, Automated Driving System raise exception for contribution to reduce energy consumption and CO_2 emissions from vehicular highway traffic. This project establishes an evaluation tool which can estimate CO_2 emission reduction effect by Automated Driving System quantitatively to promote popularization of the system.

Project Summary

The following items have been developed in this fiscal year.

I. Development of a traffic simulation model

A traffic simulation model to estimate a change of traffic flow by the introduction of the following Automated Driving System has been developed in accordance with a reference model which provides the relationships of mechanism on the impact of Automated Driving System in CO_2 emissions.

- ✓ Green wave running utilizing traffic signal information
- ✓ Advanced Rapid Transit (a route bus with precision docking and preferential passing)
- ✓ Truck platooning on expressways
- ✓ Automated driving system on expressways and general roads
- ✓ Last-one-mile transport by automated car and Automated valet parking

II. Development of a CO_2 emission model

A CO_2 emission model to calculate CO_2 emissions from automobile traffic based on driving behavior change after introducing Automated Driving System has been developed.

III. Development of a methodology to evaluate the impact of accident reduction on CO_2 emissions

Therefore the available data related to traffic condition is limited, especially in local roads, impact of traffic accident on the traffic flow has not been much cleared. The reduction of travel speed and its duration by cause of traffic accident were analyzed using traffic accident data and car probe data.

IV. Evaluation in model city

Advanced Rapid Transit in Tokyo waterfront area and Truck platooning on Shin-Tomei expressway was evaluated using the developed evaluation tool.

V. Promotion and international collaboration in R & D of CO2 reduction effect evaluation tool

We participated activities of Impact Assessment subgroup in Trilateral Automation in Road Transportation Working. Furthermore, Special Interest Session related to the impact of automated driving system on traffic flow and CO_2 emissions was organized in ITS World Congress 2016 to exchange views with experts from overseas.

Future plan

- Improvement of the developed traffic simulation model (e.g. driving behavior model in a merging section of an expressway).
- Detailed analysis of the impact of traffic accidents on traffic flow and development of a method to evaluate CO_2 emission reduction effect by the reduction of traffic accidents.
- Evaluation of the CO_2 emission reduction effect by introduction of Automated Driving System other than Advanced Rapid Transit and Truck platooning in model cities and verification of the evaluation results.