3rd SIP-adus Workshop on Connected and Automated Driving Systems 2016

Connected Vehicles

Research for advanced Traffic Signal Prediction Systems

Object of the Project

For the realization of safe driving support and automated driving systems, it is crucial to have a system that allows the vehicle to recognize traffic signal information in real time. Therefore, we will examine the following toward advancement of the roadside system which provides traffic signal information to vehicles.

a) Combination of the communication using the infrared beacon and the communication that does not use the infrared beacon.

b) Optimum installation locations for the roadside system.

c) Reduction of cost for the maintenance and operation of the roadside system.

d) Draft experiment specifications.

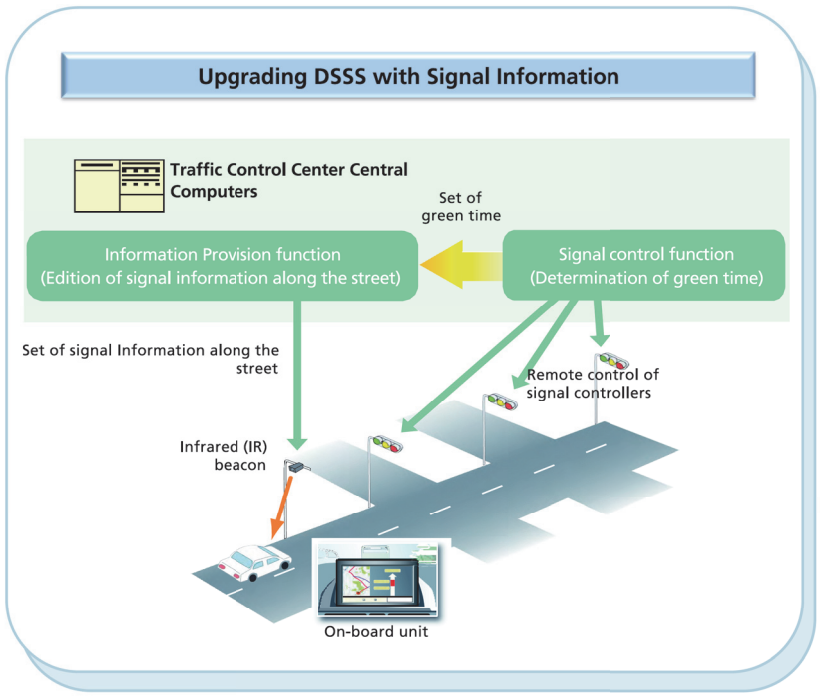
Project Summary

a) Combination of the communication using the infrared beacon and the communication that does not use the infrared beacon: We examined Wi-Fi, DSRC, Bluetooth, FM Multiplex and the 700MHz band with focus on communication performance and the amount of time for detecting communication, and concluded that the 700MHz band is most promising.

b) Optimal installation locations for the roadside system: We examined the conditions that restrict the installation location of roadside systems and the conditions that require the combined use of the 700 MHz band communication in the situation where driving support using traffic signal information is provided from the infrared beacon.

c) Reduction of maintenance and operation cost of roadside systems: We examined the configuration of the roadside system that takes into consideration the maintenance cost, simplification of setup work, etc.

d) Draft experiment specifications: We developed specifications for a model system required for a FOT(Field Operational Test).



Future plan

A comparison, etc. of the accuracy of the traffic signal information that can be obtained by vehicles will be made between the case when traffic signal information is provided by infrared beacons alone and the case when the 700MHz band is used in combination with the infrared beacon, and examination on the configuration of the roadside system will be promoted toward the realization of automated driving and safe driving support systems.

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Research for the advancement of DSSS, Driving Safety Support Systems,

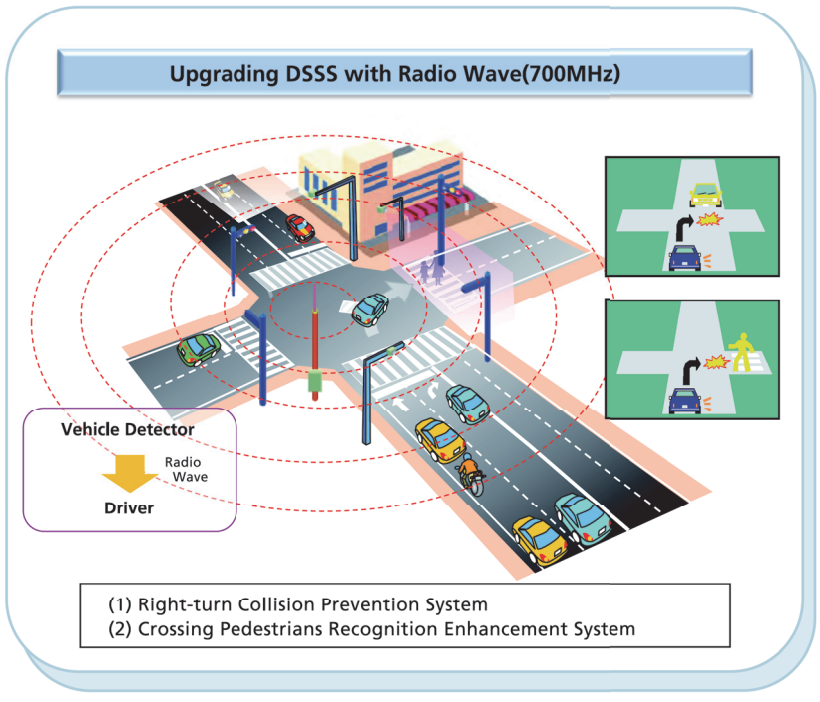
Object of the Project

In order to realize automated driving and advanced safety driving support systems, it is indispensable to grasp the surrounding conditions including the blind area of the vehicle by the sensors installed on the roadside and to provide traffic information, which contribute to the prevention of traffic accidents, in real-time. Therefore, we conduct research & development for the advancement of DSSS, Driving Safety Support Systems, which utilize ITS radio communication to provide traffic information that changes every moment.

Project Summary

We conducted research to examine and develop a system (the low-priced version for deployment) that can be deployed at a reasonable cost while still satisfying functional requirements. This research covers a communication protocol between a vehicle and roadside infrastructures to ensure communication feasibility in the mixture environment of I2V and V2V communication and functional requirements for the roadside sensors such as 79GHz high resolution radars used for the detection of vehicles and pedestrians.

In fiscal year of 2015, we examined the comparison in system configuration and deployment cost between the conventional and the low-priced version system. We also carried out the proof experiment of the low-priced version in a test course in which we completed the examination of the vehicle autonomic positioning, precision requirements of the road geographical information, functional requirements for a roadside sensor such as detection area and the I2V message set specifications.
In addition, we examined the procedures on utilizing ITS radio communication and functional requirements to operate the low-priced version and developed guidelines for the traffic control center such as the role of the traffic control center in the system life cycle (deployment – operation - disposal), a rule for security management and a measure in case of incident outbreak.



Future plan

Feasibility examination of the low-priced version,
Deployment and verification of the low-priced version,
Service expansion and investigation of future issues for automated driving.

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