Summary of SIP-adus project (FY2015)

Name of the project	A research for improvement of quick transportability, time reliability and safety of Advanced Rapid Transit
Responsible Organization	Pacific Consultants Co., Ltd.

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Object of the Project

Public Transportation Priority System (PTPS) is introduced throughout Japan as means to improve quick transportability and time reliability of a route bus running on a road where general vehicles are running together. However, there are some problems in the current PTPS. For instance, traffic signal is controlled based on bus detection information only at one upstream point of an intersection and information related to the operational status of PTPS is not provided to the bus drivers. Therefore, there are cases where the sufficient effect of PTPS cannot be obtained.
In this project, the basic requirements of an on-board bus unit and the system configuration of PTPS using 700MHz band vehicle-to-infrastructure communication to improve its efficiency (Advanced PTPS) were studied as part of the development of Advanced Rapid Transit (ART) under SIP-adus. Then, the effect of the improvement of travel speed and time reliability of ART and the impact on the general vehicles of Advanced PTPS were evaluated by a traffic simulation study and the possibility of the system was confirmed by a real machine verification in a test course. In addition, discussions with the people concern were conducted to make a plan of a field operational test for the future.

Project Summary

【Study items in FY 2015】
①Basic surveys for the current PTPS and the bus location systems and consideration about the configuration of Advanced PTPS
②Possibility study of the method for allocating passing intersection priorities to ART vehicles by the on-board bus unit
③Verification of the effect of installation of various types of dedicated lanes for ART vehicle
④Making a plan of the field operational test for the future
【Results】
1）The results of the simulation study shows the effectiveness of Advanced PTPS as follows:
- The effect of the shortening of travel time and the reduction of mean stopping frequency/stopping time at the signalized intersection of ART vehicles by the installation of Advanced PTPS was confirmed.
- There were not any significant change of the traffic throughput including the general vehicles at the intersection.
- In the route where the influence of the general vehicles to ART vehicles is large, the installation of the dedicated lane for ART vehicle was effective because the effect could not be obtained only by the installation of the priority signal control.

2）Following result was obtained by the real machine verification in the test course:
・Possibility of adjustment of the signal control based on the priority request for passing the intersection and information provision of the operational status of PTPS to the bus drivers using 700MHz band vehicle-to-infrastructure communication were confirmed under the simulative environment.

Future plan

- Further simulation study under various conditions such as traffic demand, signal control settings and so on for the effective way of introducing Advanced PTPS
- Further real machine verification in an environment closer to actual road conditions and extracting items to be tested by the field operational test
- Implementation of the field operational test to verify the effectiveness and the problems of Advanced PTPS under the real conditions and continuation of the discussion to make a consensus between the persons concerned
- Study of measures for expanding introduction of Advanced PTPS throughout Japan