

Collaborative Research on Next Generation Cooperative ITS

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1. Introduction

Cooperative ITS is a system in which vehicles, roadside devices, centers, personal terminals, and the like exchange information with each other and share such information in diverse applications for safety, road and traffic management, logistics management, environment, and information gathering/provision. For this reason, it aims to integrate vehicle to vehicle, vehicle to infrastructure, and infrastructure to infrastructure communications, thereby ensuring the consistency of communication method, data format, and so on.

2. Contents of the collaborative research

In this collaborative research, the screening of information, out of vehicle information held by vehicles and information held by the road administrator, that is mutually utilizable, and the specific methods for such information exchange were studied, thereby carrying out the research and development of next-generation cooperative ITS for efficient and low-cost road management, as well as safe and comfortable automatic driving of vehicles at the same time. The study flow chart for each individual issue is illustrated in Fig.1.

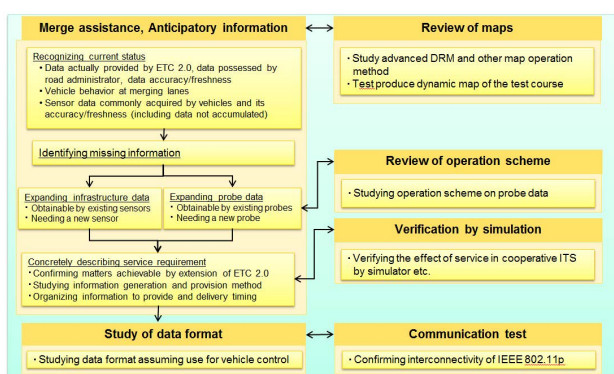


Figure 1 Study flow of individual issues

3. Results of review of individual issues

1) Study of merge assistance and anticipatory information service

Information actually provided by ETC 2.0, information possessed by road managers, and information commonly acquired by vehicles are checked, and assuming their use

for splitting/merging assistance and as anticipatory information, data was organized for missing information, accuracy, and freshness.

Additionally, the advantage to society to be gained from and the possible use for automated driving of expanding data possessed by the infrastructure side and data possessed by the vehicle side were studied. Furthermore, an analysis of ETC 2.0 probe data was conducted, and trial generation of anticipatory information was performed identifying issues to be addressed.

2) Study of operation scheme

For an operation scheme for generating anticipatory information, etc., by a cooperative ITS, discussion points were summarized regarding methods of concentrating data to the center and cost sharing among parties.

3) Verification by simulation

The effect of the service to be realized by cooperative ITS was verified using simulations and the like.

4) Study of data format of anticipatory information

The data format of anticipatory information assumed to be used for vehicle control and the server to provide such information were studied.

5) Communication test utilizing new communication method

Assuming adoption of the new communication method (IEEE 802.11p), currently under study in Europe and the United States, to the 5.8 GHz band, which is the road-to-vehicle communication frequency band in Japan, its interconnectivity was tested.

6) Study of maps in road to vehicle cooperation

High precision maps expected to be utilized in road to vehicle cooperation was test produced with NILIM testing track as the target range.

4. Conclusion

Going forward, toward the realization of a cooperative ITS, the study of specifications and the development of roadside equipment will be advanced based on the achievement of the collaborative research, at the same time proceeding with evaluating the service and examining the effects of the introduction.