Towards the Realization of Next-Generation ITS

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1. Introduction

In recent years, efforts have been made worldwide with the aim of realizing automated driving systems. In Europe and the United States, work has begun on projects to develop technology related to automated driving, and there is growing competition in development efforts, with major car manufacturers actively developing new technologies and announcing product development plans.

For the Intelligent Transport Systems (ITS) in Japan, car manufacturers are working on the introduction of driver support systems to perform functions such as controlling a car's speed and its distance from the car in front or applying the brakes in order to reduce collision damage.

In Japan, work has now begun in earnest with the aim of realizing automated driving systems such as the next-generation ITS. Some of these efforts are introduced below, and as you will see, they will be widely used in practical systems within a few years.

2. Efforts aimed at realizing the next-generation ITS

(1) Introducing the world's first cooperative ITS using vehicle-to-vehicle communication

Previously, car manufacturers implemented practical systems that enabled cars to autonomously avoid collisions and keep within traffic lanes by making use of car-mounted equipment such as radars and cameras. Autonomous driver support functions of this sort have the merit of enabling vehicles to perform detection without relying on any external capabilities in, for example, the road infrastructure or neighboring vehicles. On the other hand, they are only able to detect things that are within view of the vehicle, and when using equipment such as a camera as the detection means, the detection performance can be affected by ambient conditions such as the weather or the amount of daylight. Therefore, to provide autonomous driver support, it is expected that use will be made of systems that prevent collisions and the like based on mutual communication of information such as the vehicle's position and speed by wireless connections with other vehicles on the road, roadside equipment and the like (vehicle-to-vehicle and vehicle-to-infrastructure communication).

This sort of system is called "cooperative ITS" because it has the effect of preventing collisions and the like through a process of mutual cooperation between vehicles. At the Ministry of Internal Affairs and Communications, it was decided to make part of the 700 MHz band (755.5–764.5 MHz) available for this purpose.

In October last year, the ITS Connect Promotion Consortium was founded with a view to creating practical 700 MHz band systems, and Toyota Motor Company plans to adopt this technology in some of its new models for the domestic market starting this year. This is the world's first practical embodiment of cooperative ITS using vehicle-to-vehicle communication, and this trend has also drawn international attention.

(2) Efforts aimed at the realization of automated driving systems

In the Cabinet Office's Council for Science, Technology and Innovation, the Strategic Innovation Promotion (SIP) program was set up as an interdisciplinary and interdepartmental initiative to select issues that are essential for society and important for Japan's economic and industrial competitivenes.

One such issue is the development of an automated driving system, which is an important goal that we hope to have reached by 2020 through cooperation between industry, government and academia.

Regarding the technology needed to support automated driving systems of the future that will require advanced driving control, the Ministry of Internal Affairs and Communications is working with related government departments over a 3-to-5-year period on a project to implement advanced cooperative ITS and the like through vehicle-to-vehicle, vehicle-to-infrastructure and vehicle-to-pedestrian communication ("Establishment of next-generation ITS using ICT"). In this project, we are also developing an infrastructure radar system that uses 79GHz band high-resolution radars installed at the roadside to monitor road junctions and other locations from above in order to detect things like pedestrians and bicycles and report their presence to passing vehicles.

3. Lecture meeting: "ICT for the Next Generation ITS"

Since last year, the Ministry of Internal Affairs and Communications has been holding lecture meetings ("ICT for the Next Generation ITS") to introduce the results of our ITS-related research and development and allow other people who are actually involved in ITS-related organizations and/or corporations to deliver presentations on their latest efforts.

This year, the event was held on the afternoon of March 6th (Friday) at the Tokyo Nikkei Hall.

Thanks to the cooperation of the speakers, detailed write-ups of this event's lectures can be found elsewhere in this special feature edition.