Solutions for Advanced Cities by Mitsubishi Electric Corporation

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1. Introduction

The Japanese government has drawn up a regional activation scenario and policies for reinvigorating cities such as a compact city initiative and central city revitalization. In addition, to counter global warming by reducing CO_2 emissions in a low-carbon society, renewable energies and energy conservation measures are needed to be taken for further promotion.

This paper describes "AdvanCity," a solution for redeveloping cities to address these social issues.

2. Creating Flows of People and Promoting Activity

2.1 Train & walk

Attracting people into a city is essential to make it active. Since train stations are central hubs of cities, providing train passengers with information is important. Advertisements and traffic information are now frequently displayed on video systems in trains, using Mitsubishi's train vision system. Passengers on the train can read information about events and bargain sales in the city, and when they get off the train at a station, interactive digital signage await them. This enables the search and acquisition of various information items such as visitor and map information inside/outside the station. Inside buildings and cities, the "video delivery system" can deliver multiple sources such as digital high-definition video to the multi-display units.

2.2 Park & ride

ITS technologies for the next-generation car-oriented society have yielded outcomes in pilot programs conducted by national agencies and various organizations. The time has come to deploy the technology in an actual city.

When we enter a city after automatic adjustment of expressway tolls with an Electronic Toll Collection (ETC)[1)]-equipped car, we can also make automatic payments at parking lots, filling stations and fast-food restaurants. To boost traffic safety, demonstration tests for the system of delivering safety-related information from the ground to vehicles are underway, such as the system for preventing accidents at intersections, that uses Dedicated Short Range Communication (DSRC)[2] system. By Mar., 2010, we intend to mass-produce and sell next-generation car-mounted extended ETC system (car-mounted ITS system), which enables information delivery in a city and various services such as detour guide information for relieving traffic congestion and providing visitor information and information about events at commercial facilities, etc.

The DSRC communication antennas as the ITS infrastructure are installed in a city to achieve a traffic "DSRC town" (Figure 1).

3. Safe Space for Anybody to Relax with Peace of Mind

3.1 Building security

Since people have recently tended to center on state-of-the-art large buildings, establishment of advanced safety by installing the integrated security system "DIGUARD" has been required. "DIGUARD NET," which uses the optical IP network in the building as its backbone, ensures integrated linkage by combining surveillance cameras, security gates, information security and access log management. In our head office building, the Suica[3)] card was introduced for employee ID cards for the first time in Japan and interlocked with access gates, access control on floors, information security at offices and office machines.

3.2 Town security

Safety of city areas and regions requires a system that transmits the signals from the various sensors that detect intruders and video signals with sensor functions by performing image processing of videos on the surveillance cameras to the security center at high speed via the optical IP network and monitors the areas and regions in real time.

1) ETC is a registered trademark of the Organization for Road System Enhancement.

2) DSRC is the bi-directional radio communication technology which achieves high-speed communication of about 4 megabits per second within a specific spot at a communication distance of several tens of meters to few hundred meters.

3) Suica is a registered trademark of East Japan Railway Company.

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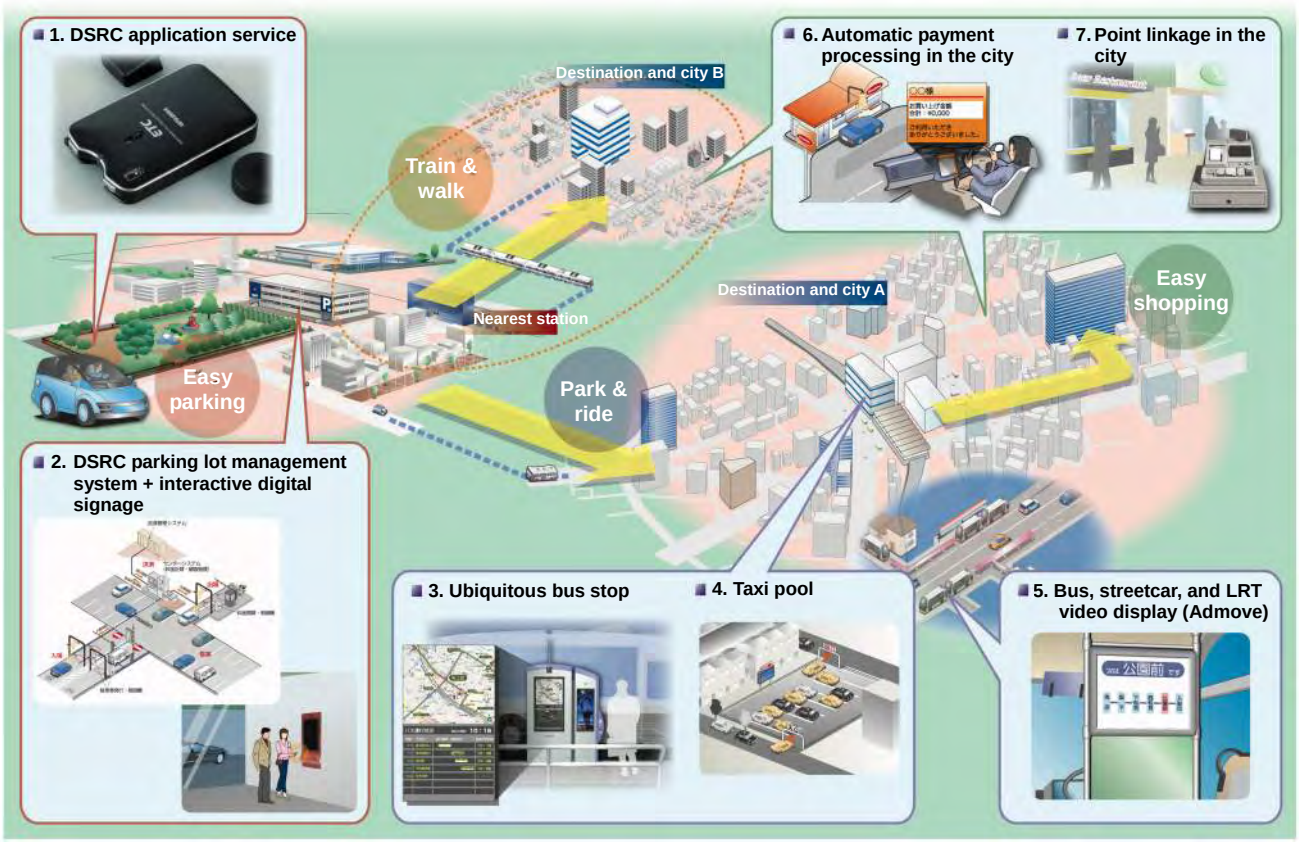

Fig. 1 DSRC Town

4. Environmentally-friendly, Sustainable City Development (Eco Town)

Technologies to achieve environmental friendliness and energy saving are essential themes to address social issues. To achieve a low-carbon society, the following measures has to be taken as needed, when constructing new buildings:

(1) To adopt the industry's leading energy-saving equipment
(2) To accomplish energy-saving management using the Building Energy Management System (BEMS)
(3) To achieve Town Energy Management System (TEMS) in buildings
(4) To apply renewable energy (photovoltaic generation system, etc.)

These measures reduce CO_2 emissions in the entire city. The leading energy-saving devices are connected via the IP network in the buildings to achieve BEMS. For energy management, functions are used to "visualize" the values measured by various sensors and air-conditioning and lighting control status of rooms where people stay (making the current use status easier to understand) and enable employees to prolong facility operation and change the temperature, etc. from the web page on their office personal computers; and then, these functions come into wide use.

5. Infrastructure to Support Social Ubiquitousness

5.1 Network infrastructure

The core component of the network infrastructure for AdvanCity is an optical IP network.

We recommend using the Gigabit Ethernet-Passive Optical Network (GE-PON) adopted by communication carriers and access terminals for the physical layer of the optical IP network to configure a high-speed network.

The IP telephony and mobile environments are provided by combining a wireless local area network (LAN) with this network to allow information communication for multiple uses.

5.2 Town management center

In this system, information about security, video, air conditioning, etc. in buildings is collectively operated and managed in the integrated range of buildings and areas.

The main management center in the range is referred to as the town management center. Its functions include:

(1) Video & voice information contents delivery
(2) Security monitoring
(3) Traffic/electronic money smart card management (automatic adjustment, etc.)
(4) Town Energy Management System (TEMS)

(5) Map-based facility and information management/maintenance operation management

Server groups to process these functions and a data center to accommodate the server groups are necessary. A consortium of regional and private developers is expected to manage the data center.

6. Conclusion

This paper has described that new technological themes covered by each report of this special issue are used for city redevelopment, regional and city revitalization, etc. to create a modern Japan for next generation.

We will ensure that our “city development solutions” meet the expectations as a one-stop contact for customers engaged in city development.