Brief introduction to Intelligent Transportation System, ITS

Definition

Intelligent Transportation System (ITS) applies advanced technologies of electronics, communications, computers, control and sensing and detecting in all kinds of transportation system in order to improve safety, efficiency and service, and traffic situation through transmitting real-time information.

Objectives

- to improve traffic safety
- to relieve traffic congestion
- to improve transportation efficiency
- to reduce air pollution
- to increase the energy efficiency
- to promote the development of related industries

Content

Generally, ITS is classified into five systems according to their functions as follows.

ATMS detects traffic situations, transmits them to control center via communication network, and then develops traffic control strategies by combing all kinds of traffic information. Furthermore, ATMS makes use of facilities to carry out traffic control and transmits the information to drivers and concerned departments, and implements traffic management measures, such as ramp metering, signal control, speed control, incident management, electronic toll collection and high occupancy vehicle control and so on.

2. Advanced Traveler Information System, ATIS

ATIS, with advanced communication technology, makes road users can access real time information in the car, at home, in the office or outdoors as the reference of choosing transportation modes, travel trips and routes. The system mainly includes changeable message signs, Highway Advisory Radio (HAR), GPS, the internet connection, telephone, fax, cable television, information Kiosk and mobile etc .

3. Advanced Vehicle Control and Safety System, AVCSS

AVCSS applies advanced technologies in vehicles and roads, and helps drivers control vehicles in order to reduce accidents and improve traffic safety. The AVCSS mainly includes anti-collision warning and control, driving assistance, automatic

lateral/longitudinal control, and the long-run plans of automatic driving and automatic highway system.

4. Advanced Public Transportation System, APTS

APTS applies the technology of ATMS, ATIS and AVCSS in public transportation in order to improve the quality of service, and increase efficiency and the number of people who take public transportation. The syste m mainly includes automatic vehicle monitoring, VPS, computer scheduling and E-tickets.

5. Commercial Vehicle Operation, CVO

CVO applies the technology of ATMS, ATIS and AVCSS in commercial vehicle operation such as trucks, buses, taxes and ambulances in order to improve efficiency and safety. The system mainly includes automatic vehicle monitoring, fleet management, computer scheduling and electronic payment.

Framework

According to the concept framework of future ITS development planned by U.S. DOT and ITS-America, the relationship between ITS services was defined to ensure the compatibility and the interchangeability. 7 functions and 30 users services provided to drivers are defined as follows:

1. Travel and transportation management

   • Driving information during travel

   • Route guidance

   • Travel service information

   • Traffic control

   • Incident management

   • Emission monitoring and improvement

   • Rail road level crossing

2. Travel demand management

   • Demand management and operation

   • Pre-trip information

   • Carpool matching and pre-booking

3. Public transportation operation

   • Public transportation management

   • Public transportation information during travel

   • Personalized public transportation

   • The security of public transportation

4. Electronic payment

   • Electronic payment service

5. Commercial vehicle operation

   • The electronic customs clearance of commercial vehicle

   • Automatic security roadside inspection

   • Security monitoring in car

   • Commercial vehicle management program

   • The incident response of dangerous goods

   • Cargo flexibility

6. Emergency management

   • Emergency notification and personal security

   • Emergency vehicle management

7. Advanced vehicle control and safety system

   • Back-up collision prevention

   • Side collision prevention

   • Intersection collision prevention

   • The vision improvement of traffic accident prevention

   • Security preparation

   • Collision prevention before accident

   • Automatic highway system