# WHAT IS ITS AND IT'S SCOPE

## Introduction by
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# What is ITS?

"the application of advanced sensors, computer, electronics, and communication technologies and management strategies—in an integrated manner—to improve the safety and efficiency of the surface **transportation system**".
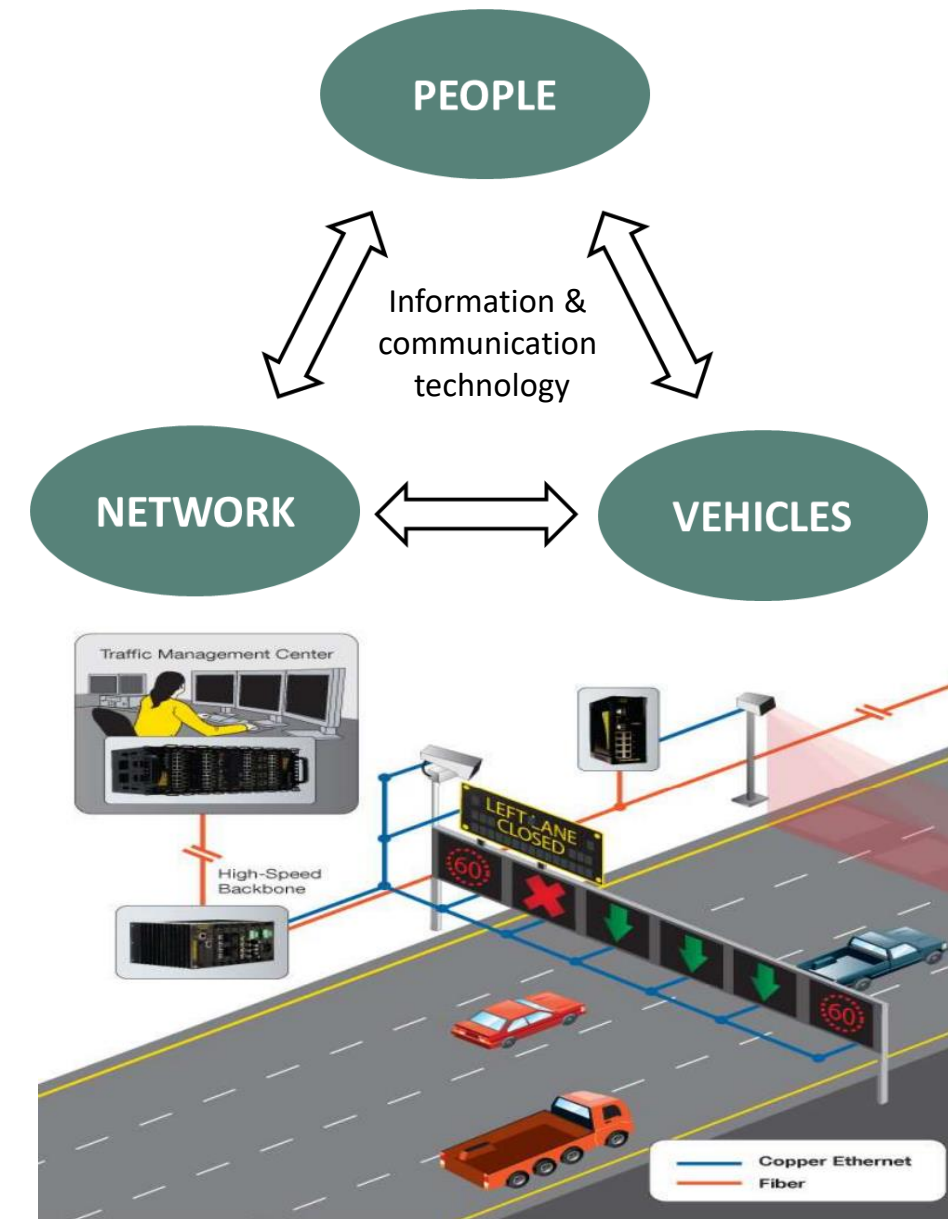
# Intelligent Transport Systems

## Concept

ITS are combinations of **information processing, maps, databases, communications and real-time data** from a range of sensors, to produce solutions that enable –

➤ Infrastructure owners and operators to improve the quality, safety and management of transport networks;

➤ Individual travellers, drivers, hauliers, transport operators and authorities to make better informed, more 'intelligent' journey decisions;

➤ Network operators and 'third party' service providers to supply advanced information services, increasingly on a multi-modal basis, to all types of traveller; and

➤ Road users to drive safer, 'smarter' vehicles.

## Utility

➤ It provides support to improve services in transportation system operations, such as traffic management, commercial vehicle operations, transit management and information to traveller.

➤ In general it has potential to reduce travel time, reduce the frequency and severity of crashes, improve flow, reduce cost and improve customer satisfaction.



PEOPLE

Information & communication technology

NETWORK

VEHICLES

Traffic Management Center

High-Speed Backbone

LEFT LANE CLOSED

Copper Ethernet
Fiber

# Glimpse of ITS in Transportation  Sector



**Interaction Journey Planner for all modes**

**Automated Vehicle Location System**

**Real-Time Traffic Information System**

**Automated Fare Collection System**

**Car Sharing/ Cycle Sharing System**

**Intelligent Signaling System**

**Real- time Monitoring System**

**Parking Information System**

Dr Sanjay Gupta, SPA Delhi,

# ITS User Services

| Bundle | User services |
|---|---|
| **1. Travel and traffic management** | 1.1 Pre-trip Travel Information |
| | 1.2 En-route Driver Information |
| | 1.3 Route Guidance |
| | 1.4 Ride Matching and Reservation |
| | 1.5 Traveller Services Information |
| | 1.6 Traffic Control |
| | 1.7 Incident Management |
| | 1.8 Travel Demand Management |
| | 1.9 Emissions Testing and Mitigation |
| | 1.10 Highway Rail Intersection |
| **2. Public Transportation Management** | 2.1 Public Transportation Management |
| | 2.2 En-route Transit Information |
| | 2.3 Personalized Public Transit |
| | 2.4 Public Travel Security |
| **3. Electronic Payment** | 3.1 Electronic Payment Services |

# Types of ITS Application based Systems

## Urban

| S. No. | System | Technology |
|---|---|---|
| 1. | Road Network | • Variable Message Signs (VMS)<br>• Wireless sensor network<br>• Real-time data collection<br>• Traffic Forecasting Algorithms<br>• Control Systems, etc. |
| 2. | Public Transport | **Fleet Management & Operation**<br>• Automatic Passenger Counter<br>• Automatic Vehicle Location<br>• Geographic Information Systems<br>• Scheduling and Dispatch<br>• Traffic Signal Priority<br>**Traveller Information Systems**<br>• Automated Trip Itineraries<br>• In-Vehicle Announcers<br>• Interactive Kiosks<br>• Variable Message Signs and Monitors<br>**Electronic Fare Collection** |
| 3. | NMT (Bicycles) | • Enhanced Warning at Crosswalks (EWaC)<br>• Green Wave<br>• Intelligent Road Studs, etc. |
| 4. | Urban Freight | • Fleet management systems<br>• Vehicle routing and scheduling<br>• Slot booking/terminal management<br>• In cab communication systems, etc. |

## Regional / National

| S. No. | System | Technology |
|---|---|---|
| 1. | Highway | • Ramp Metering<br>• Automated Speed Detection<br>• Incident Management<br>• Electronic Toll Collection<br>• Traveler Information<br>• Vehicle control technologies |
| 2. | Regional Rail | • Automatic Train Location<br>• Train Movement Management<br>• Train Data Management<br>• Remote Train Maintenance Management<br>• Smart Ticketing<br>• Passenger counting<br>• On-vehicle security & surveillance<br>• Infotainment |
| 3. | Airways | • Smart ticketing<br>• Passenger Information System<br>• Airway Traffic Management System<br>• Advanced Security Management System<br>• Real-time Information |
| 4. | Regional Freight Operations & Handling | • Weigh-in motion technologies<br>• Vehicle and freight location information<br>• Freight condition information<br>• Warehouse operations and inventory information |

# Emerging Trends in ITS Applications

## Integrated Fare Management

Integrated fare management solutions help both commuters and transportation system operators.

**Example, Smart Cards like "Oyster Card" in London**
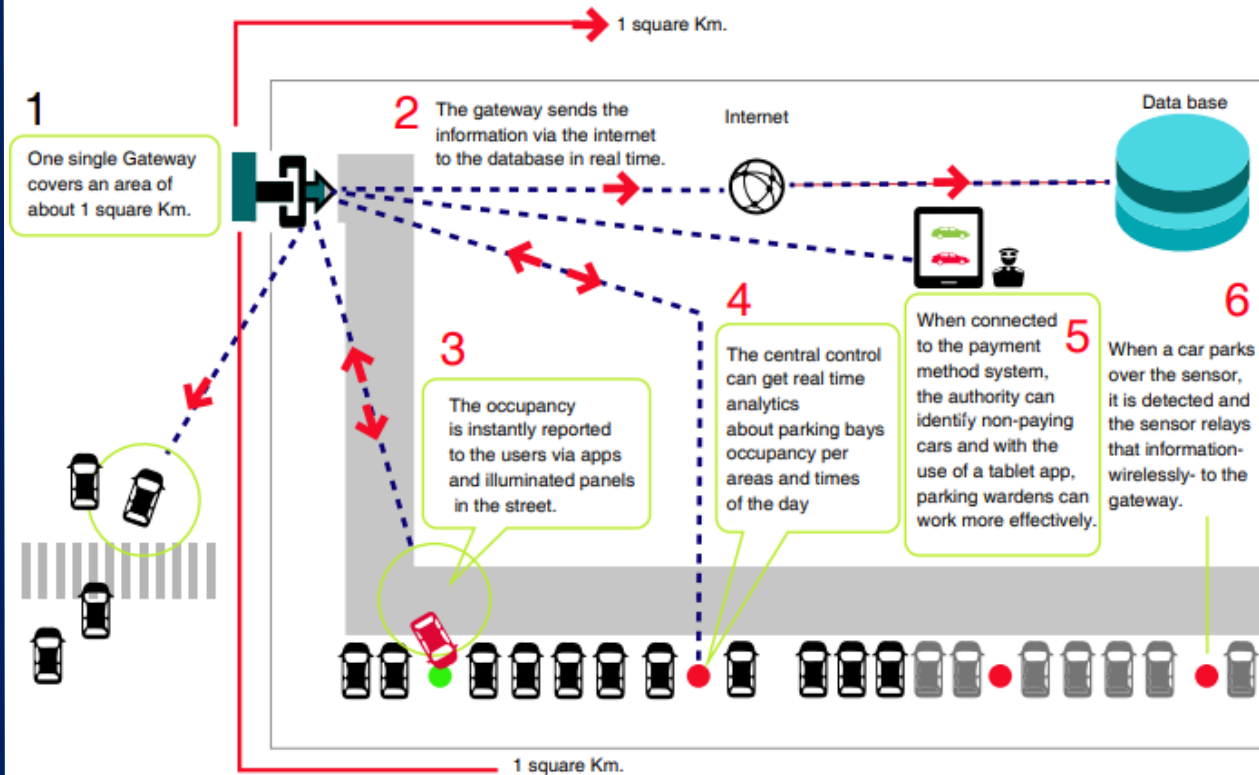


### Benefits for Operators

- ✓ Simplified cash management & Seamless transfer
- ✓ Revenue sharing & apportionment among the different operators
- ✓ Decreased levels of fare evasion & fraud loss
- ✓ Improved asset utilization & lower maintenance costs
- ✓ Creative & flexible fare policies

### Benefits for Commuters

- ✓ Reduced boarding times
- ✓ No need to wait for tickets
- ✓ Less need for cash or correct change
- ✓ Fast, secure and convenient transactions
- ✓ Customized service: the ability to recharge or cancel the card
- ✓ Easy access to their own transport usage transactions

## Smart Parking

Smart Parking systems typically obtains information about available parking spaces in a particular geographic area and process is real-time to place vehicles at available positions



1 One single Gateway covers an area of about 1 square Km.

2 The gateway sends the information via the internet to the database in real time.

3 The occupancy is instantly reported to the users via apps and illuminated panels in the street.

4 The central control can get real time analytics about parking bays occupancy per areas and times of the day

5 When connected to the payment method system, the authority can identify non-paying cars and with the use of a tablet app, parking wardens can work more effectively.

6 When a car parks over the sensor, it is detected and the sensor relays that information- wirelessly- to the gateway.

# Emerging Trends in ITS Applications

## Connected Vehicles

Connected vehicles are vehicles that use any of a number of different communication technologies to communicate with the driver, other cars on the road.

| V2I | V2V | V2C | V2P | V2X |
|---|---|---|---|---|
| Vehicle to Infrastructure | Vehicle to Vehicle | Vehicle to Cloud | Vehicle to Pedestrian | Vehicle to Everything |

**BENEFITS**

- Crash Elimination
- Reduced Need for New Infrastructure
- Travel Time Dependability
- Productivity Improvements
- Improved Energy Efficiency
- New Models for Vehicle Ownership
- New Business Models and Scenarios

## Autonomous Vehicles

Autonomous vehicle (AV) technology offers the possibility of fundamentally changing transportation. Equipping cars and light vehicles with this technology will likely reduce crashes, energy consumption, and pollution—and reduce the costs of congestion.
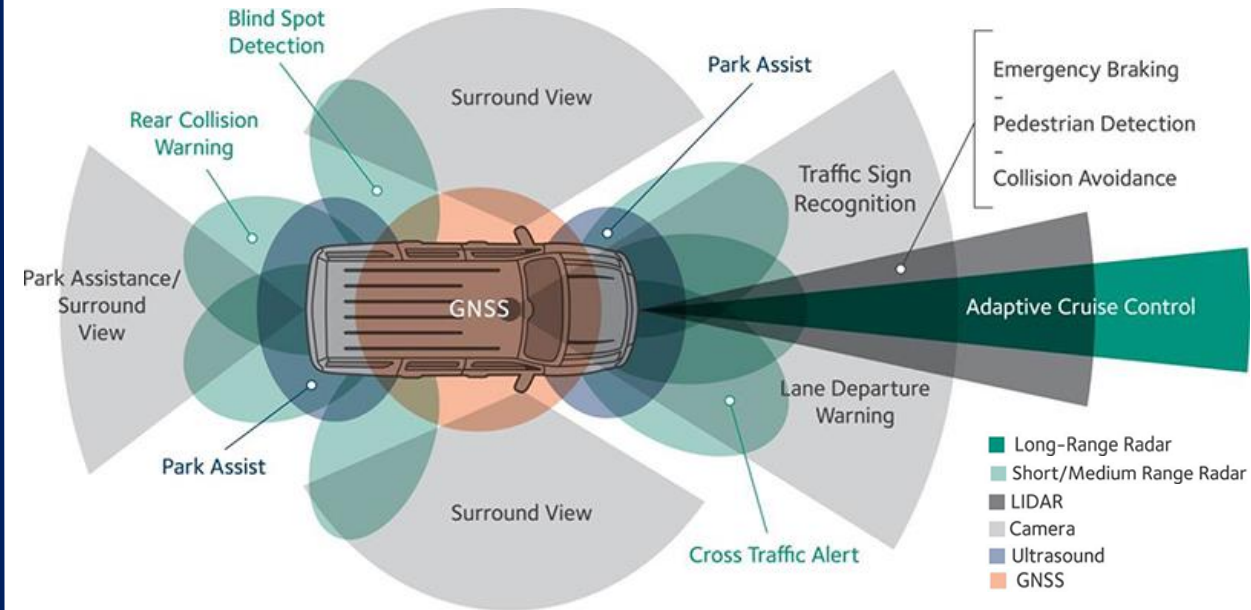


- Increasing accessibility for people who are unable to drive themselves;
- Reducing the cost of taxis and delivery services;
- Reducing the demand for off-street parking; and
- Increasing road safety and capacity.

- Thanks