

ITS and Traffic Safety in China



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Content

♦ General Situation of ITS in China

◆Improving Road Safety through the Application of ITS



I. General Situation of ITS in China



1. Development Route



1st Stage: Starting

1995-2000

ITS Strategy

ITS Architecture

GDP: 790 billion \$

Vehicle: 36 m (1995)

2nd Stage: Development & Demo

2001-2005

Technology research

&

Demo in City and Expressway

GDP: 1400 billion \$

Vehicle: 90 m (2002)

3rd Stage: Integrated App

2006-2010

ITS Service in Olympic, World Expo and Asia Games

ETC in Expressway

ITS in Water Transport

GDP: 3400 billion \$

Vehicle: 160 m (2007)

2. Evaluation of ITS in China



(1) Urban Area

- Major projects: Intelligent traffic management technology R&D and application
- Large City
- Effect: positive

(2) Highway

- Major projects: ETC and Expressway Monitoring
- ETC in 24 province (to the end of Sept. 2012)
 - ETC lane: 5400
 - ETC User: More than 5 million
- Effect
 - ETC : positive
 - Expressway Monitoring : not so well



(3) Traffic Information Service

>Just beginning

(4) New Technology Research for ITS

- ➤ Just beginning:
 - Intelligent control
 - Data management
 - Interoperability
 - Cooperative system, et. al.

(5) ITS Industry and Market

>Low level



3. Typical ITS Case Study



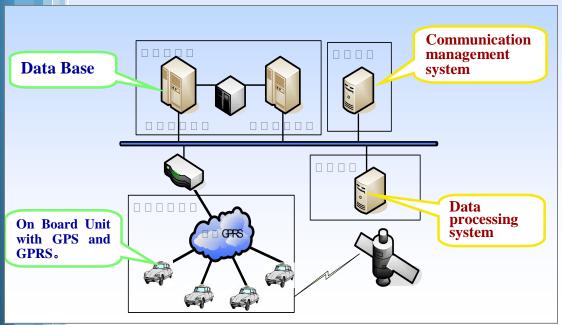
(1) Traffic Information Service

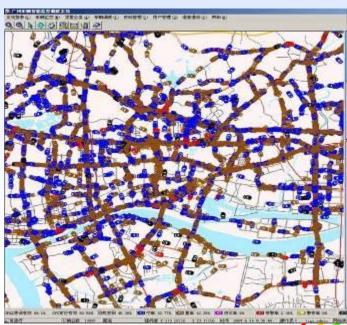
- **♦** Urban areas
 - Data collection
 - > Vehicle detector
 - ➤ Probe cars: GPS, Mobile phone
 - Information service
 - > Broadcast
 - >VMS
 - ➤ Navigator
 - ➤ Website
 - ➤Intelligent phone
- Expressway



① Probe Car

- ♦ Beijing: More than 60,000 taxies
- ♦ Shanghai: More than 20,000 taxies
- **♦** Guangzhou: More than 20,000 vehicles (taxi+bus)
- **♦** Hangzhou: About 6,000 vehicles





(2) Traffic Information on Website





③ Beijing: Transport Information System











Traffic information service

- Broadcast
- Real Time Route Guidance via VMS
- Navigator
- Website

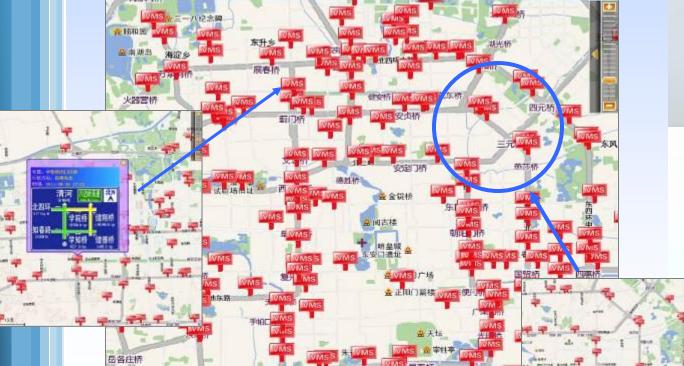








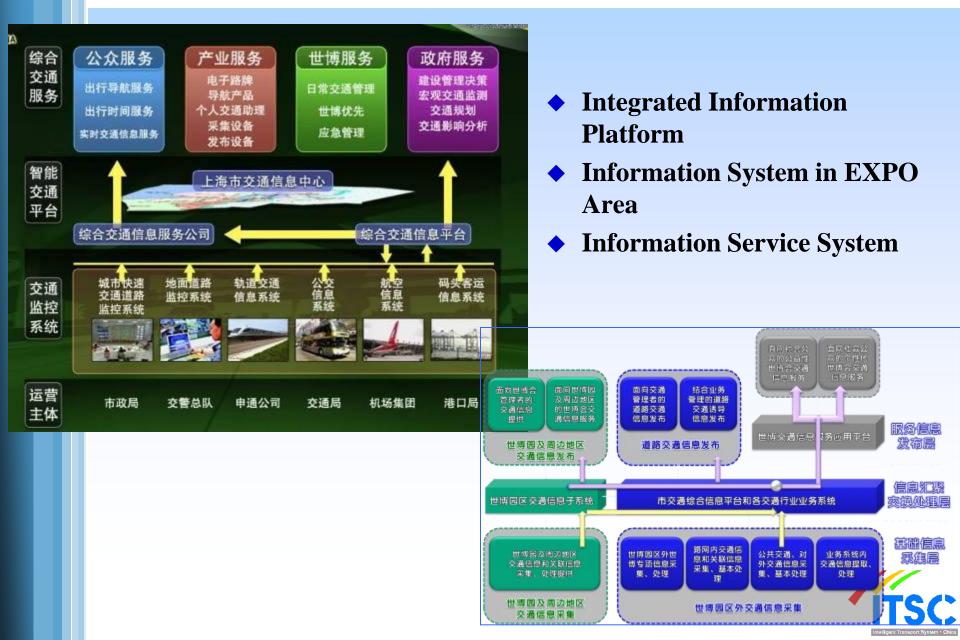
- A integrated system
- Cover urban area
- About 500 VMS







4 Shanghai: City Traffic Info Platform



Traffic Information Collection

Road

Information Collection

City Motorway

Street

Expressway

Loop

Camera

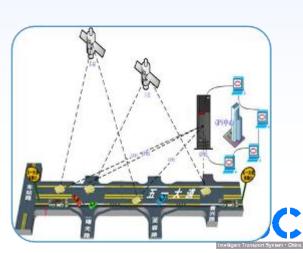
Signal control system

Probe car

Mobile phone







Traffic Information release via VMS



Wide Area Navigation





Traffic Information Service via other media

Micro-blog

Info Station











Mobile Phone





Call Center





Navigator



Broadcast



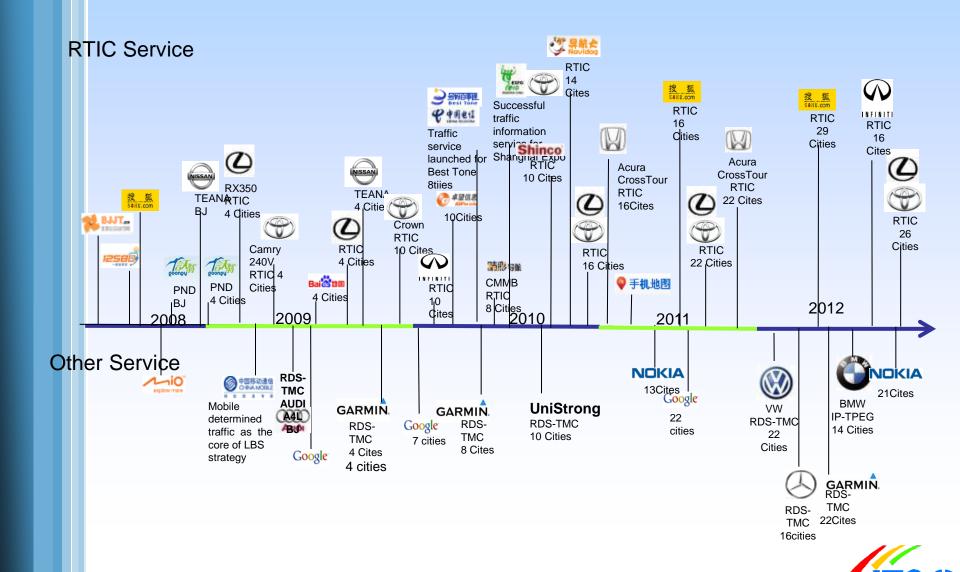
(5) Traffic Information via Navigator



- **♦** Navigator no Real Time Traffic Info
 - Digital Map + GPS
 - Large Numbers: Sold 7 million navigators in 2011
- **♦** Navigator with Real Time Traffic Info
 - Less than 1 million users total
 - Several companies provide service in different standard
 - RTIC (Road Traffic Information of China)
 - ➤ Adopt Chinese Standard
 - ➤ Provide Service in Several Cities via FM
 - ➤ Website: Map + Road traffic info



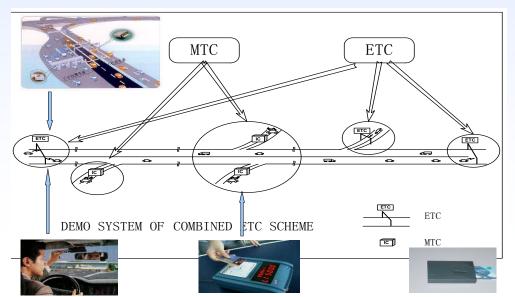
Road Traffic Info Service from 2008 to 2012



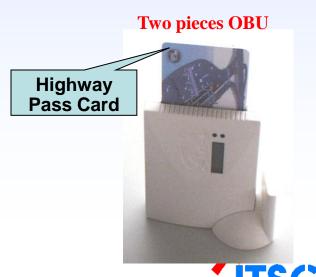
(2) ETC in China

(1) Technology System and Scheme

- **◆ ETC Standard in China**
 - National ETC Standard: 2007
 - Based DSRC Technology
 - > Frequency:5.8 GHz
 - Semi-Active (awakening) and two pieces OBU
- China Expressway ETC System
 - ➤ Combined ETC System

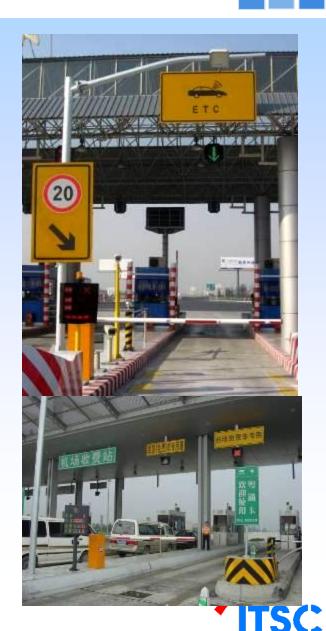






2 Deployment

- Development and Test from 1998
 - ➤ Province Demo: Guangdong, 2004
- National Expressway ETC
 System Pilot Engineering
 (2007~2009)
 - ➤ Must adopt China National Standard
 - ➤ Beijing, Shanghai, Jiangsu, Anhui, Jiangxi, Hebei, Tiangjin, Zhejiang
- National Wide Deployment from 2010



● To the end of April, 2013

- ETC service opened in 26 provinces
- ➤ More than 5400 ETC lanes have been built
- ➤ More than 5 million ETC users
- **Beijing**
 - ETC usage rate in main toll station of Jingcheng expressway : 39%
 - Average ETC usage rate in Beijing: 34%





(3) Urban Traffic Management





Example of Intelligent Urban Traffic Management in Beijing

- Police Command System
- Intelligent Traffic Signal Control System
- Traffic Surveillance System
- Transport Operation and Coordination and Control



1 Police Command System



- Command
- Control
- Information support
- Emergency management

32 subsystem



② Intelligent Traffic Signal Control System

- Area traffic signal control
- Public transport priority
- City motorway meter-control





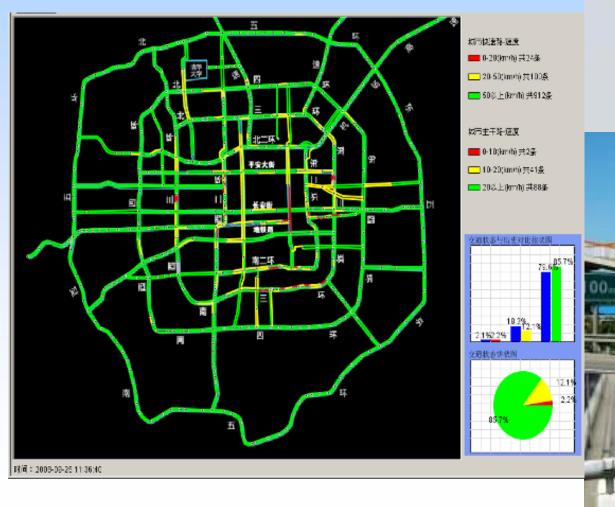


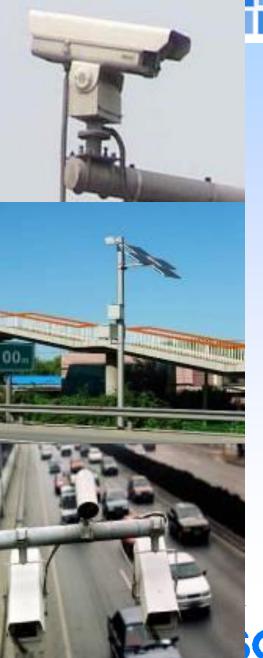




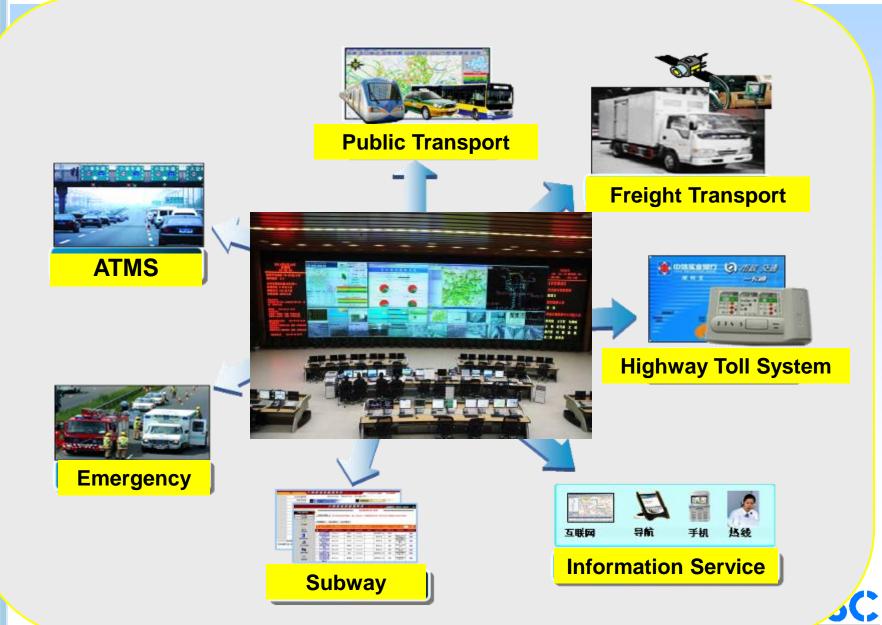


Traffic Surveillance System





Transport Operation and Coordination and Control



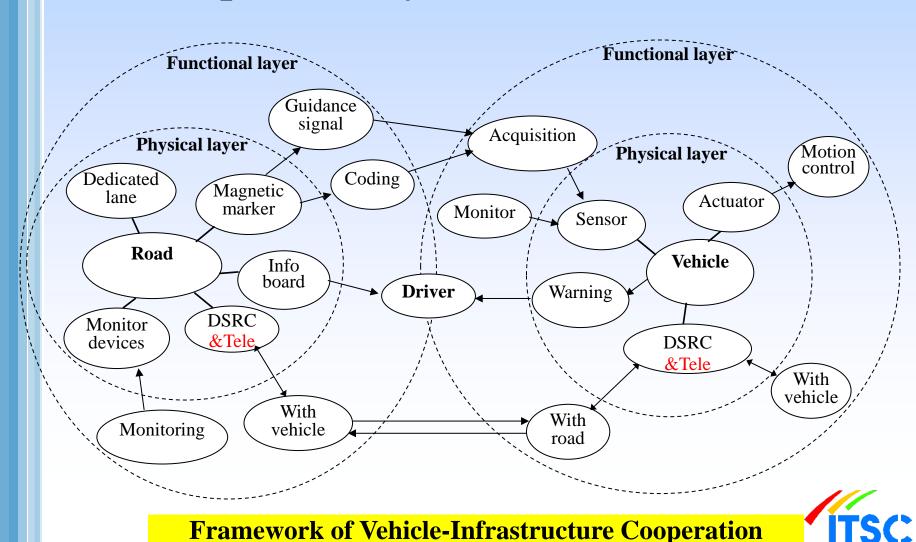
II. Improving Road Safety through the Application of ITS

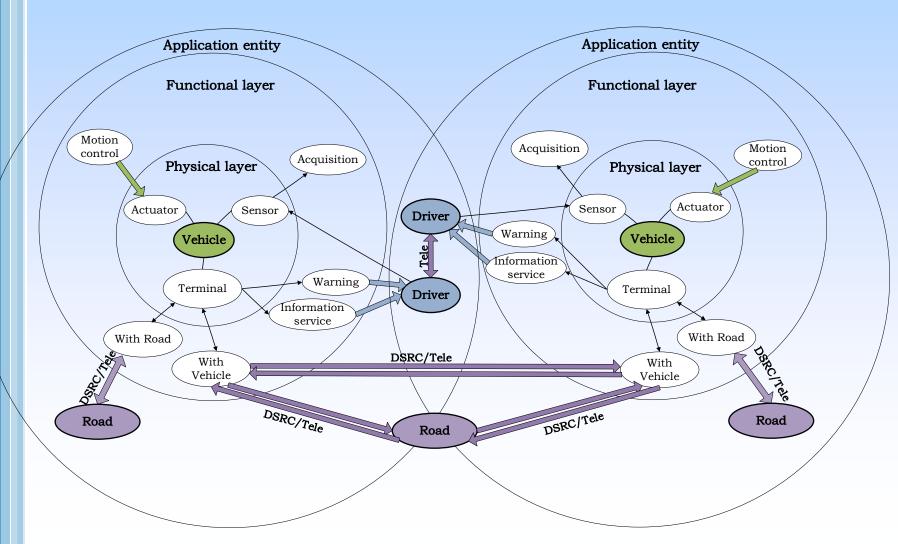


1. Cooperative ITS for Traffic Safety



(1) Cooperative System Architecture









(2) Research Projects

(1) Communication in ITS

1. Communication Architecture for ITS

2. Communication Technology in ITS

1-1 Study of Need for Communication in ITS

1-2 Study of Communication Technology Using Scene in ITS

1-3 Development of Communication Architecture for ITS

2-1 Evaluation of Key Communication Technology in ITS

2-2 Demo of Communication in ITS

2-3 DSRC Development

2 Cooperative System Technology Development

- On board system technology
- **◆** Road side system technology
- Communication and control
- **♦** Simulation
- **◆** Integration



3 Connected Vehicle Research





Research in University

Development in Telecommunication Company

SmartEarth 云平台服务

政府车联网云服务

商用车车联网云服务

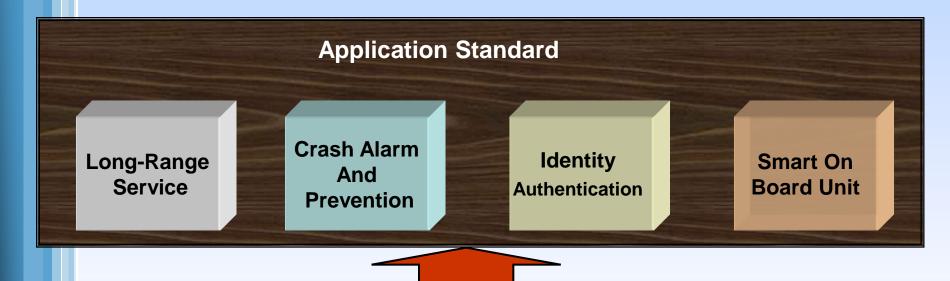
车辆运维与物流电
子商务服务

移动通信网络
GSM/GPRS/CDMA/3G

互联网

4 Standardization

The Standard Framework of Cooperative System



Commication In ITS Framework and Specification For Cooperation System

Physical and MAC

DSRC

Network and App

Device





♦ Cooperative System, DSRC

- Part 1: General Technology Requirement
- Part 2: MAC and Physical Layer
- Part 3: Network and Application Layer
- Part 4: Equipment Application

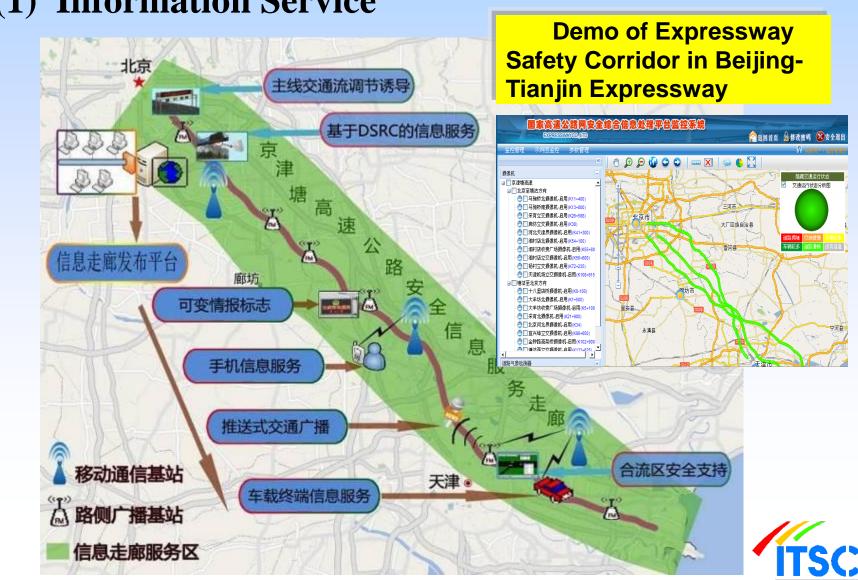
Cooperative System, Application

- General Technology Requirement for Telematics Service of Vehicle Monitoring and Traveler Information
- Function Requirement of Vehicle Crash Warning

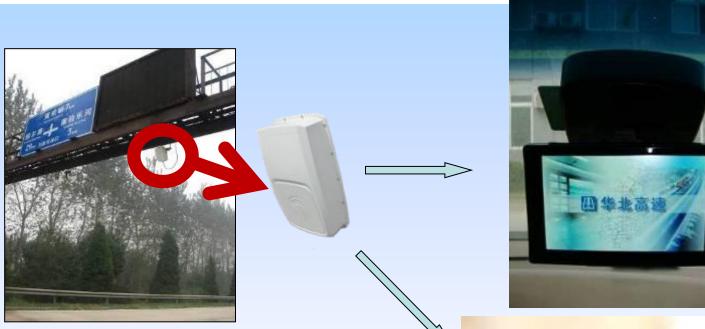


3. Demo and Application

(1) Information Service



TEST: Traffic Information Service via DSRC



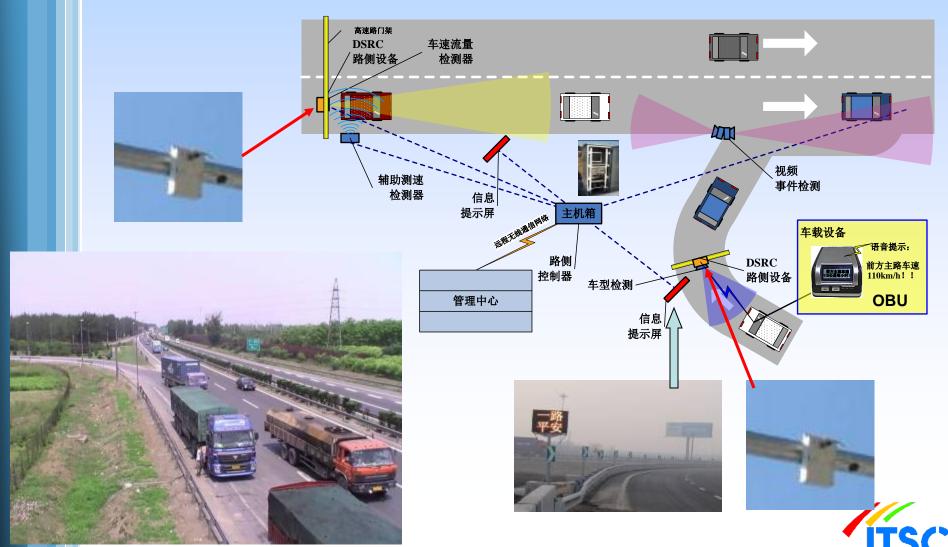




OBU: ETC + Information Service

(2) Cooperative System Demo



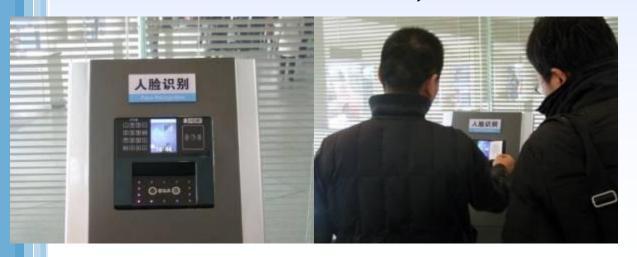


(3) Vehicle and Fleet Management Systems

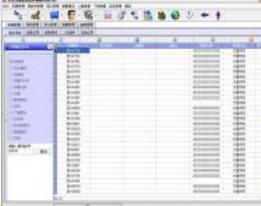
- Driver Management Systems
- GPS Monitoring
- Tachographs

Integrated









In-vehicle device and software management systems of regular digital tachographs

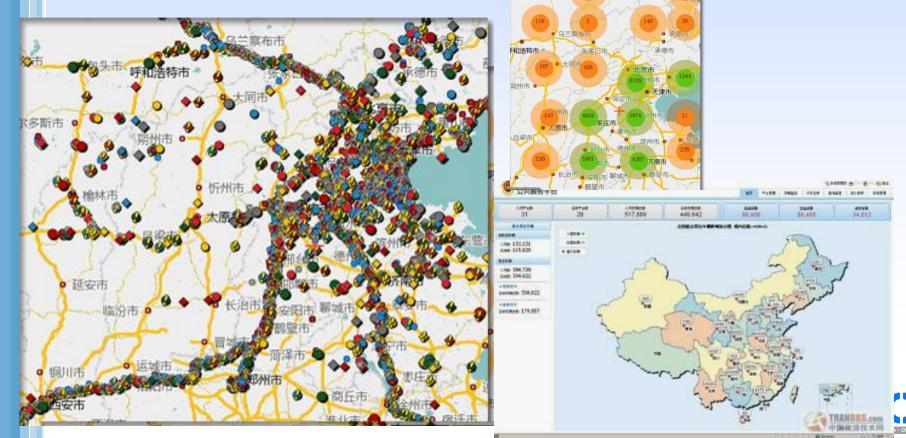
Commercial vehicle drivers IC card and fingerprint identity authentication system



National Commercial Vehicle Monitoring System

- **♦ Integrated 1000 GPS Service Companies**
- GPS Service Company Province Government Platform
 National Platform
 - Sharing information, Monitoring vehicle and driver, Management

♦ On line vehicle: 1.6 million



(4) Speed limit enforcement and warning systems



Capture camera on a Special road



Typical provinces accident index changes before and after the installation of speeding capture

Accident index Location	Before installati on (year)	After installation (year)	Accident index year (increase +, decrease -)		
			Number of accidents	Deaths	Injuries
Guizhou Province	2005	2006	-79.33%	-39.3%	-57.61%
Guangdong Provincial Expressway	2004	2005	-70.8%	-32.5%	/
Kunming City, Yu Jiang Road, Tai Chi Road, Huijiang Road	2005.5-8	2006.5-8	-54%	-75%	-36%
Sichuan Muchuan State Road 213 and Highway 103 lines	2004	2005	-28%	-33%	/



4. International Cooperation



- **◆ Technical Information Exchanges**
 - Examples
 - Data
 - Information of Testing and Evaluation
- **◆** Joint Research
- **♦** Seminars and Workshops
- **♦** Standardization Cooperation



Thank You!

