INTELLIGENT TRANSPORT SYSTEMS ON HIGHWAY NETWORK

MINISTRY OF TRANSPORT MARITIME AFFAIRS &COMMUNICATIONS

General Directorate of Turkish Highways

TEM-TER Intelligent Transport System Workshop
Ankara
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DG Highways Road Network (01.03.2012)

- Designing, constructing, maintaining and operating 65.167 km of road network
- 17 divisional directorate
- 7 operate motorways

- 2.236 km **MOTORWAY**
- 31.373 km **STATE ROADS**
- 31.558 km **PROVINCIAL ROADS**

65.167 km
Intelligent Transport Systems

ITS focus on mainly

1) Motorway toll systems
2) Traffic management systems
3) Traveller information systems
Motorway toll systems

Toll authority
- General Directorate of Turkish Highways (GDH)
- First toll facility: 1st Istanbul Strait Bridge in 1973

Clearance house
- Banks (Protocol is signed between GDH&Banks laying down the rights&obligations)

Operation system
- Open type systems (1st & 2nd Istanbul Strait Bridges)
- Closed type systems (5 closed toll motorways)
Toll system

1973
- Cash & pre-paid ticket

1999
- DSRC* non-stop tolling

2005
- Contactless smart card.

4 March 2011
- Full cashless

- Toll plaza: 94
- DSRC lanes: 317
- Smart card lanes: 423

In 2011
- Vehicle: 349,000,000
- Revenue: 892 Million TL (~373 Million Euro)

*DSRC: Dedicated Short Range Communication
ETC architecture
OGS (DSRC), KGS (Smart Card)

- 5 banks for OGS
- 7 banks for KGS
- OGS: 2.1 million subscribers
- KGS: 11.2 million subscribers
- “OGS” is the acronym of DSRC non-stop tolling system
- “KGS” is the acronym of contactless smart card system
OGS (DSRC), KGS (Smart Card)

Toll transaction percentages by payment type

Revenue by payment type
Role of the banks

- Enrolling users
- Supplying on-board units & Smart cards
- Managing bank accounts
- Issuing bank statements (e.g., Transactions details and bank account balance)
Lane configuration
Lane equipment

Lane controller

- Transceiver & card reader-encoder
- Video Enforcement Systems
- Automatic Vehicle Classification
- Toll & Vehicle Class indicator
- Toll barrier
- Traffic and canopy sign
- Gong
DSRC & On-board unit

- Compliant with CEN TC 278
  - 5.8 Ghz
  - 5 Mhz bandwidth
  - Downlink : 500 kb/s
  - Uplink : 250 kb/s
- 4 different company products
Contactless smart card

- MiFare ISO 14443-A Standard
  - Communication at 13.56 MHz
- Two type cards
  - Electronic purse type
  - Bank account/credit card backed type
Integrated toll & traffic management
Integrated toll & traffic management

- On-board units
- Data from
  - Toll lanes
  - Overhead gantries
- Travel time calculation
Travel time estimation

22 km
Travel time estimation

TRAVEL TIME ESTIMATION USING ON-BOARD UNIT

TIME OF DAY (HOUR)

TRAVEL TIME (MINUTE)
ITS facilities

- 3 Management centres on motorways (İstanbul, İzmir, Mersin)
- 1600 Signalisation on state and provincial roads
- Over 100 Variable Message Signs (VMS)
- 97 Speed detection & warning systems
- 536 Permanent & Portable Traffic counting & classifying devices

İstanbul, İzmir, Mersin
The inductive loop detector is commonly used for permanent traffic counting and classifying applications as well as short term applications. The data supplied by conventional inductive loop detectors are vehicle passage, presence, count, occupancy, speed and classification.

The operation of inductive loop sensors is well understood and their application for providing basic traffic parameters (volume, presence, occupancy, speed, classification, and gap) represents a mature technology. The equipment cost of inductive loop sensors is low when compared to non-intrusive sensor technologies.

By the year 2012, we have 200 inductive loop detector devices. We use them for permanent surveys to get traffic data from roads.
Traffic Counting & Classifying System

General Overview to The System Operation

Traffic Counting and Classifying Devices on Roads

GPRS Network

GSM/GPRS Service Provider

Internet

VPN

Web Server

User

KGMNET

The traffic data gathered by the devices on roads is transmitted to the Center via the GPRS communications during 365 days - 24 hours. And all the devices are online all the time.
ITS deployment

- Extending ITS to state & provincial roads
- Reorganisation in 2010-2011
  - New administrative units at headquarter and regional divisions regarding ITS
- Dual Carriageways at first
- ITS will focus on
  - Traffic management systems
  - Traveller information systems
Future perspective

- Nationwide integrated system
- Main Traffic Management Centre in Ankara
- 17 Regional Traffic Management Centres
- Fibre optic cable 7500 km for inter-centre communication
- Widespread implementation of traffic management & traveller information systems on state & provincial roads
- Completion of the project up to 2023
Future perspective-integrated ITS
Applications for tunnels 1

- Enclosed facilities
- Special conditions
- Increasing of safety

- 61 tunnel longer than 500 m. in operation
Applications for tunnels 11

- Power
- Illumination
- Communication
- Fire detection
- Extinguishing
- Air quality control & ventilation
Applications for tunnels 111

- Traffic control
- Incident detection
- CCTV
- Public announcement
- Radio broadcasting
- Telecontrol
- Control centre
• Thank you for your attention