Overview about the Slovak Electronic Tolling System
The Project – Agenda & Implementation

• Work on the technical and operation concept and preparation of the tender phase started in 2007 on the behalf of NDA (Slovak motorway agency)

• ETC system was designed, build and operated by Skytoll a private company

• The implementation phase lasting less than 12 months started with signage of a service contract with Skytoll on January 13th, 2009

• During testing, more than 300 000 kilometers were logged to ensure proper segments recognition and charging.

• The system was considered operationally ready by an independent technical advisor appointed by NDS and conditionally accepted in early Dec 09. Operation started January 1st 2010.

• During next 6 months, full acceptance is expected.
1 - Toll Prescription
- The value of the coefficient of toll transactions distinguishing must exceed 95%.

2 - Toll Collection
- 100% of proposals to the issuing of payment orders/legal actions must be filed within 7 days after the vain
- commence the distrait procedure must be filed within 10 days from the executability of payment orders/legal
- actions, provided that the debtor fails to pay voluntarily by then.

3 - Distribution, Administration and Maintenance of On-Board Units
- Supply of On-Board Units amounting to more than 0 pieces at all Distribution and Contact Points during every day of the reported period.
4 - Enforcement
- The scope of the coverage of the total volume of tolled transport flow at Specified Road Sections by the service
- Enforcement must exceed 15%.

5 - Customer Services
- 80% of calls in the Call Centre must be answered within 15 seconds during every day of the reported period.

6 - Maintenance and Repair of Technologies
- The time of the restoration of the Service after failure of the components of the Electronic Toll Collection
- computer centre ensuring Toll Prescription, the service Enforcement and the service Customer services in real time must not exceed 8 hours from the time of reporting.

7 - Restoration and Innovation of Technologies
- Fulfilment of the service Restoration and Innovation of Technologies within planned deadlines.

8 - Toll Collection
- Value of the efficiency of toll collection must amount to at least 98.91%.
• The Slovak project aimed at implementing the 2nd free flow GNSS/CN based ETC system (Germany is first). Main differences between Slovakia and Germany:
  • The OBU is “self installable (no tachygraph connection or gyroscope) enabling an ETC system not requiring a “dual component”
  • Toll calculation is done in the back office which simplifies charging mechanism
  • 1st class road are tolled apart from motorways and expressways

• During the implementation phase, lasting 12 months, 3 critical risk areas were concerned:
  • The system design and roll-out including localization and testing: Extensive procedures put in place and effective communication between the stakeholders
  • The management of OBU supply in a wide distribution network: During the rapid ramp-up additional capacity was put in place. Queuing was limited in length and duration.
  • The distribution of OBUs to all customers: Occasional, foreign users, etc is a key challenge to every OBU based ETC operator.
Key Facts about Slovak ETC (1/2)

- A multi lane, free flow GNSS/CN based ETC system
- Toll data collection based on an obligatory self installable On Board Unit (OBU):
  - OBU requires electrical power from vehicle
  - No external antennas required
  - Contains GNSS, GSM, and Micro wave DSRC
  - Fully compliant with EC regulation
- Enforcement of ETC based on a 46 fixed and portable roadside installation and 25 mobile enforcement units
- Back office software system is fully redundant and located in two separate data centers. Data protection procedures are implemented
• Operational Data after 2 months of operation:
  • 134,326 vehicles registered – 127,955 OBUs in operation – 15,000 OBUs returned after usage
  • 59% of vehicles are Slovakian and 41% are from other countries
  • 77% of OBUs in operation are Pre-Paid and 23% Post-Paid
  • A total of 1,824 invoices have been issued for January and February
  • Multi contact channel strategy: Web portal (more than 100,000 visits/contacts in 2 months) contact center (more than 60,000 contacts in 2 months)
The ETC network comprises of more than 2,000km of motorways, expressways and 1st class road

- 571 km of tolled motorway and expressway
- 1,455 km of 1st class roads (of 3,275 km network of 1st class roads)
System components 1/3

GNSS
Système Satellite

Géo localisation

Equipement Embarqué (OBU)

Réseau GSM

Proxy (ETBO)

SCI
• Toll Data Collection (including distances for calculation of tolls) is based on segments with predefined lengths using GPS positions for reference.

• The logic of segment detection is implemented in the OBU using simple geo reference objects (entry point, control point and direction of travel).

• The actual tolling is done in the back-office (very similar to the principles followed in the mobile phone industry).
System components 3/3

Key Parts:

- Built-in GPS antenna and receiver
- GSM / GPRS Module
- DSRC / Microwave module
  - According to Automotive Standards
  - Motion sensor
  - Unauthorized manipulation sensor

Technical Data

- Processor: ARM9, 200MHz, až do 300 MIPS
- Memory: RAM 32 MB, NAND-Flash 128 MB
- GSM / GPRS modem: quad band, multi-slot class
- GPS receiver: SiRF Star III™
- Dimensions (without holder): 145 x 126 x 61
Lessons for future Projects

• Apart from technical aspects of ETC, specific attention needs to be paid on commercial conditions between ETC Operator/EETS/Users

• Relationship between Authority and Toll Operator is a key factor of success in terms of acceptability, adaptability, reliability, etc especially in economic crisis context