The technology used in the Genoa trial (1/2)

The system is built up by two main subsystems:

- **Local unit**: data acquisition, real time pre-elaboration, delivery to central unit
- **Central unit**: data reception, data processing, database management

A local unit (gate) consists of:

- one pole with a camera and two infra-red lights;
- two magnetic inductive loops, able to detect and cluster traffic flows and to trigger acquisition;
- one elaboration unit processing the images by the OCR sw and managing the lists of authorized plates
The main characteristics of the system are:
• possibility to manage white lists up to 200,000 plates;
• recognition time less than 2 seconds (= 1800 vehicles per hour per lane);
• recording capacity, at local level, up to 25,000 images.

The system performances have been very good, as given by the following indexes:
• OCR error rate = 6÷7%
• Average system availability = 96,9%

(Statistics have been calculated over a 6 months period = about 6,8 millions of total transits)
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How should road users be charged?

1) Technology options

• The reliability of the OCR system used in the trial is very good; however, a “physiological” (at the state of the art) error rate of 6% implies however a big amount of man-work necessary for the recovery of not recognized images.

• Necessity of integrating different technologies in order to reduce system errors, to automate the process and to reduce the operational costs:
  • OCR
  • Radio-frequency based systems
    • TELEPASS (developed by Società Autostrade) is the Italian standard for toll-paying on motorways: this technology is certificated and widely used.
    • Genoa is now testing a new technological device based on Radio-frequency and direct charge on bank account by electronic credit card
GENOA

PayPay / PayCar system

Credit/Debit Accounted Card

- Issued by Banks: quite similar to a “card”
- Allows payments with PIN entry (device may be used as a personal Pin Pad)
- Stores transactions details (road pricing, EFTPOS, etc.)
- Stores securely payment, proprietary and loyalty transactions data
- Transmits data with banking-level security
- Bluetooth™ connection with PCs, Mobile Phones, Palm-Tops
- Device cost: lower than proprietary transponders
- Road Pricing: payments through a “Road POS”
GENOA

PayPay / PayCar system

The system under test

Genoa is now testing a particular application of this technology:

- Installation of radiofrequency buoys on the 6 existing gates and of On Board Equipments on drivers cars
- A special equipment to detect the transit and to allow the transaction compatible with the bank security standards has been developed, and is now under testing in the real environment. The fee is automatically charged on bank account through a Bluetooth™ connection
GENOA

How should road users be charged?

2) Payment Methods

Various payment methods should be foreseen, according to the different user characteristics.

1) Direct charge on bank account (using TELEPASS, Smart cards or other Radio-frequency based systems) – for frequent users

2) Direct payment (see London scheme): dedicated kiosks, Web/Wap techniques – for occasional users

3) For drivers who don’t use any of the previous methods, toll collection could follow the path of the other municipal services such as waste collection payment.
How should enforcement operate?

In Italy the whole procedure is regulated by the DPR 250/99 “Standards for authorization, installation and service of detection system for cars accessing LTZ”

- Charge on bank account or collection with local services: an eventual lack of payment should be prosecuted as an administrative violation via a standard procedure; technological tools already available
- Direct payment: the payment directly cancels the violation
- No payment: transmission of the plate number to the standard procedure for fines emission and collection.
How should privacy be ensured?

Privacy problems arise in two different moments:

1) Detection
   The procedures to be followed are defined by the Italian privacy law and by a particular decree that outlines the forms of plate video detection on road. In any case privacy must be ensured through the certification of the Body who manages data.

2) Toll collection
   • Charge on bank account or collection with local services: the procedures must follow the Italian law for electronic data protection. Moreover, data must be delivered only to the interested user
   • Direct payment: the direct payment itself cancels any privacy problem
   • Violation: the procedure is the same of fine emission and collection (electronic data protection, etc.)