

# IMPROVEMENT OF SAFETY ON POLISH ROADS BY USE OF INTELLIGENT TRANSPORTATION SYSTEMS

## **SAFETY THAT PAYS FOR ITSELF !**

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on Clean, Efficient & Safe Urban Transport**

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# Content

- Examples of ITS systems
  - Speed/red light enforcement systems
  - Traffic management systems
  - Vehicle Weight Enforcement
  
- ITS influence on transport safety and efficiency



# ITS in The World

- ITS = intelligence + transportation + system
- ITS systems are regarded as very cheap and efficient way to improve safety and efficiency of transport
- Red light cameras: commonly used in USA – thousands pieces in all states,
- Speed cameras: widely used in EU (e.g. in GB more then 500 pieces) and other countries (e.g. in Slovakia more then 100 pieces)
- Weigh-in-Motion systems: 342 sites in EU (in 1998)
- Traffic Management/Control Systems – almost in all cities that have more than 50 traffic lights



# ITS in Poland now

- Decision makers prefer to invest in concrete: roads, bridges etc.
- Almost no ITS systems
- Very few speed (around 20) and red light cameras
- Very few WIM systems (5 pieces)
- No Traffic Management/Control Systems

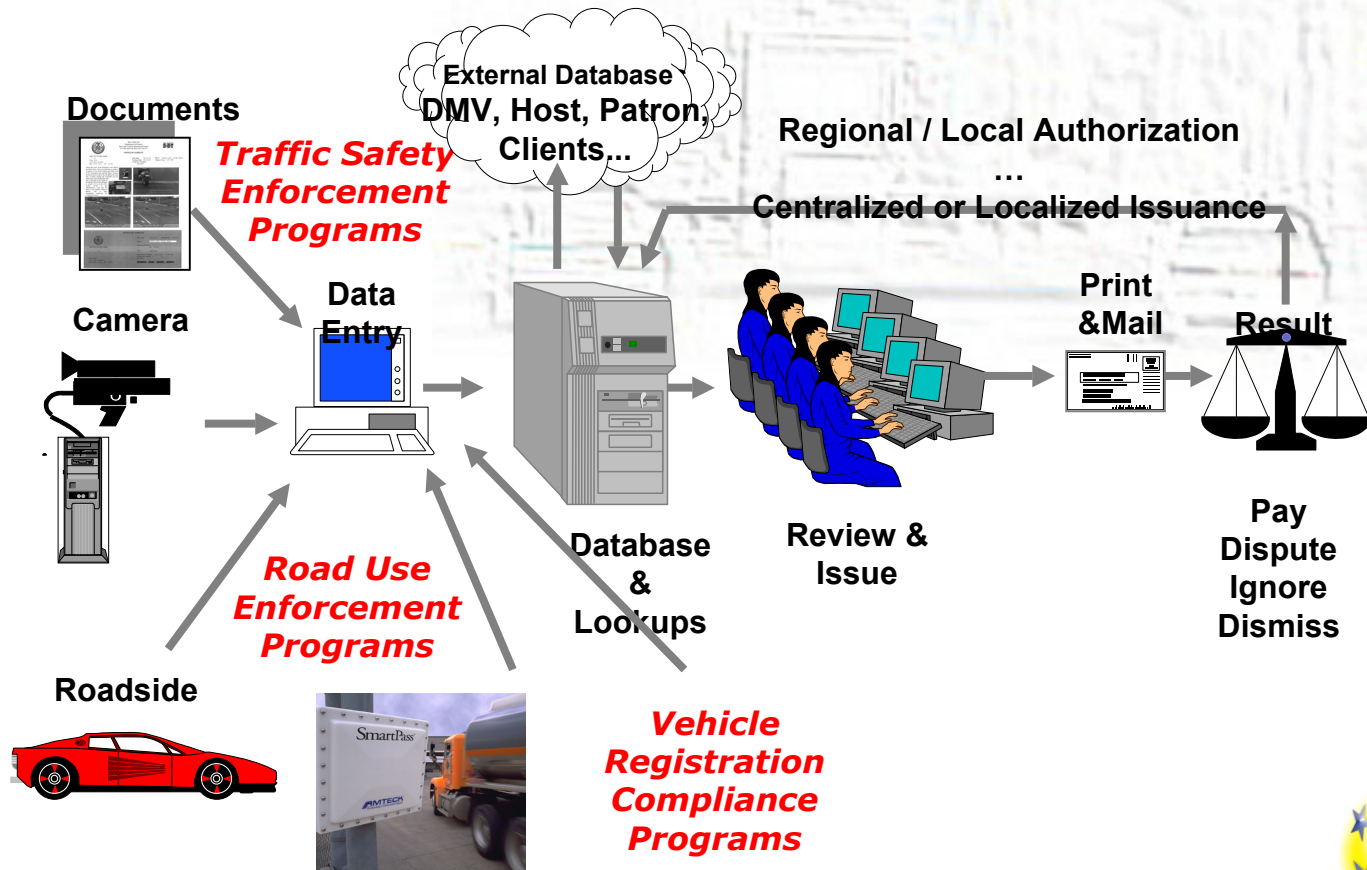


# Efficient Enforcement is Key to Law Compliance

- Automated Violation Detection Increases Violation and Non-Compliance Detection
  - Increased Violation Detection ➔ Increased Law Compliance
  - Increased Law Compliance ➔ Improved Traffic Safety
  - Increased Law Compliance ➔ Increased Revenue Collection
- Automated Violation Detection Enables Law Enforcement Officials to Focus on Higher Value / Safety Activities



# Polish National Vehicle Violation Processing System via Automated Violation Detection



Source: Transcore Inc.





# Speed/red light enforcement systems

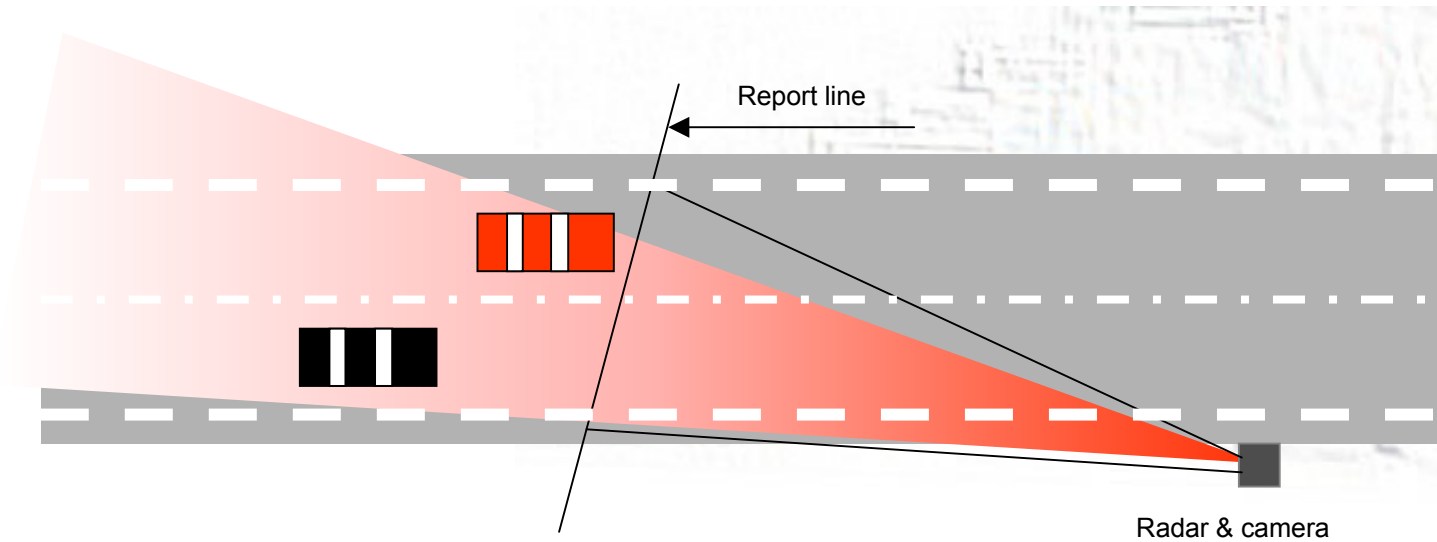


# Integrated speed/red light enforcement system

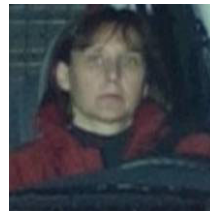
- Implementation of **high quality** speed/red light cameras, providing possibility to identify driver and car registration
- Implementation of vehicle/driver data base
- Implementation of efficient violation data processing system



# How modern speed camera works



Speed camera takes a picture of the speeding car, registration number and face of driver at „report line”



# Fixed and mobile versions of speed camera



In-vehicle version



Cabinet version



Mobile version



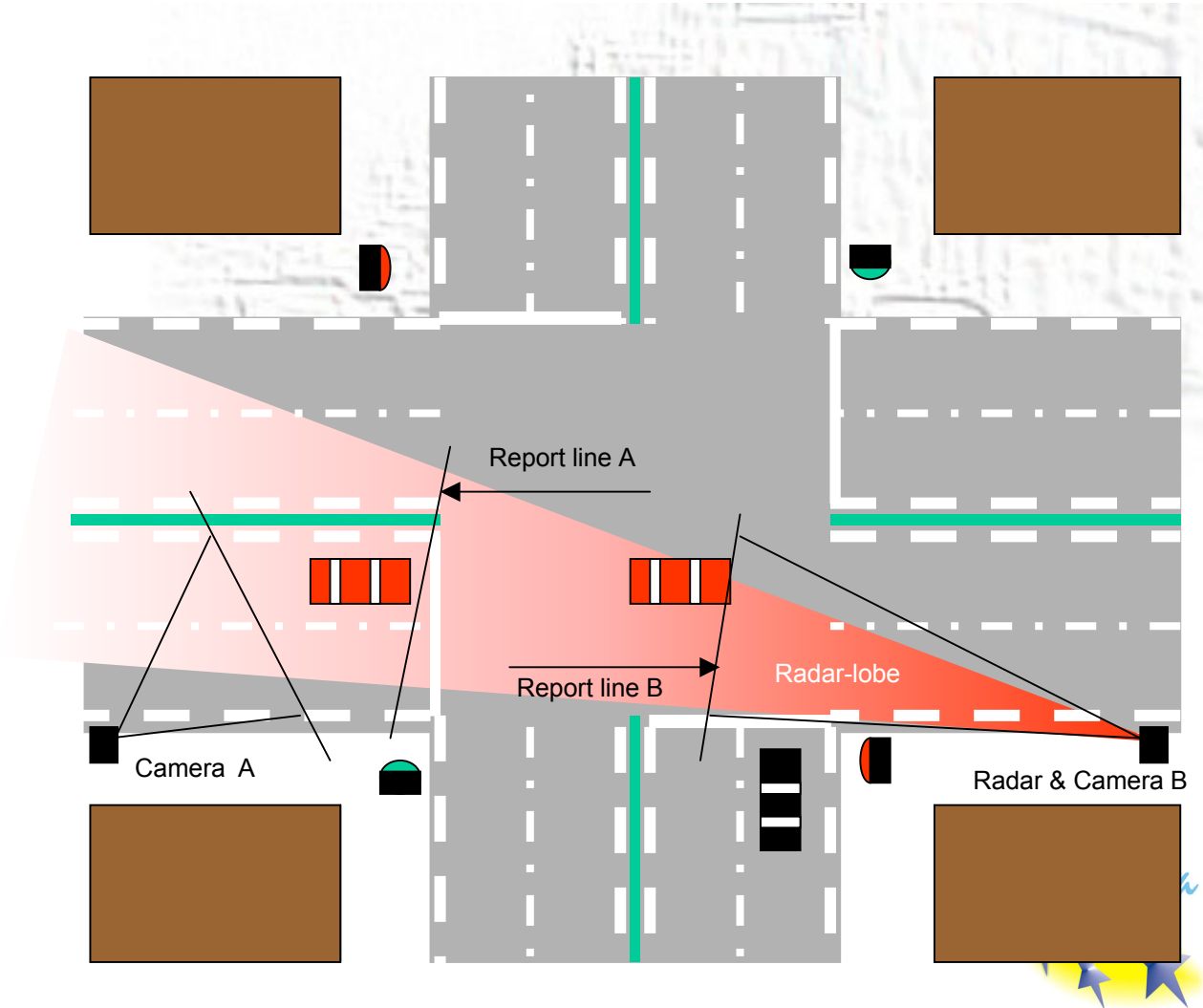
Source: Sensys Traffic AB



# Red Light Safety System

The system is active during the red phase. When the sensor detects a vehicle running a red light:

- Camera A exposes a photo for license identification.
- Camera B exposes a photo for driver identification.



Source: Sensys Traffic AB

# Red Light camera in Sweden



# Speed Enforcement System in Sweden

## Iggesund - Hudiksvall

- 1990-98 seven people were killed and 65 people were injured.
- The society cost estimated by the National Road Administration was during the same period 21 million USD.
- This was the first installation within the new project
- The first two years no accidents were reported.
- The main reason of the result was the reduction on the average speed (9 km/hour).



# Red Light Enforcement in USA

## Oxnard, CA:

32% reduction in right angle collisions

68% reduction in injury collisions

## San Francisco, Oxnard & Fairfax Virginia:

Violation rates reduced between 40% and 45%

## Charlotte, NC:

72% Reduction at 20 monitored intersections

## San Francisco & Oxnard, CA:

*Spillover Effect:* Measured reductions in collisions at non-monitored locations



## Possible results in Poland


- Reduced number of car accidents (deaths, injuries) – Police statistics reports: 30% accidents caused by speeding cars
- Reduced external and internal costs (one death according to COST313 report costs 1 mln Euros)
- Increased revenue from tickets
  - If 1 speed camera records 500 violations per day = 100 000 zł per day = 36 mln zł per year
  - **100 cameras = 3,6 mld zł of additional revenue**



## Global results

- AVI & TSES Camera-based Compliance Enforcement Coupled with one Centralized VPC can Concurrently Support National, Regional and Local Objectives & Needs
- Police can be Re-deployed to Higher Priority Functions (Crime Prevention & Public Safety)
- Infrastructure Investment can be Leveraged to Support Multiple National Objectives Yielding Multiple Benefits:
  - Increased Law Compliance
  - Increased Revenue
  - Enhanced Traffic Safety
  - Centralized Compliance Management / Localized Control
  - Consistent Compliance Practices

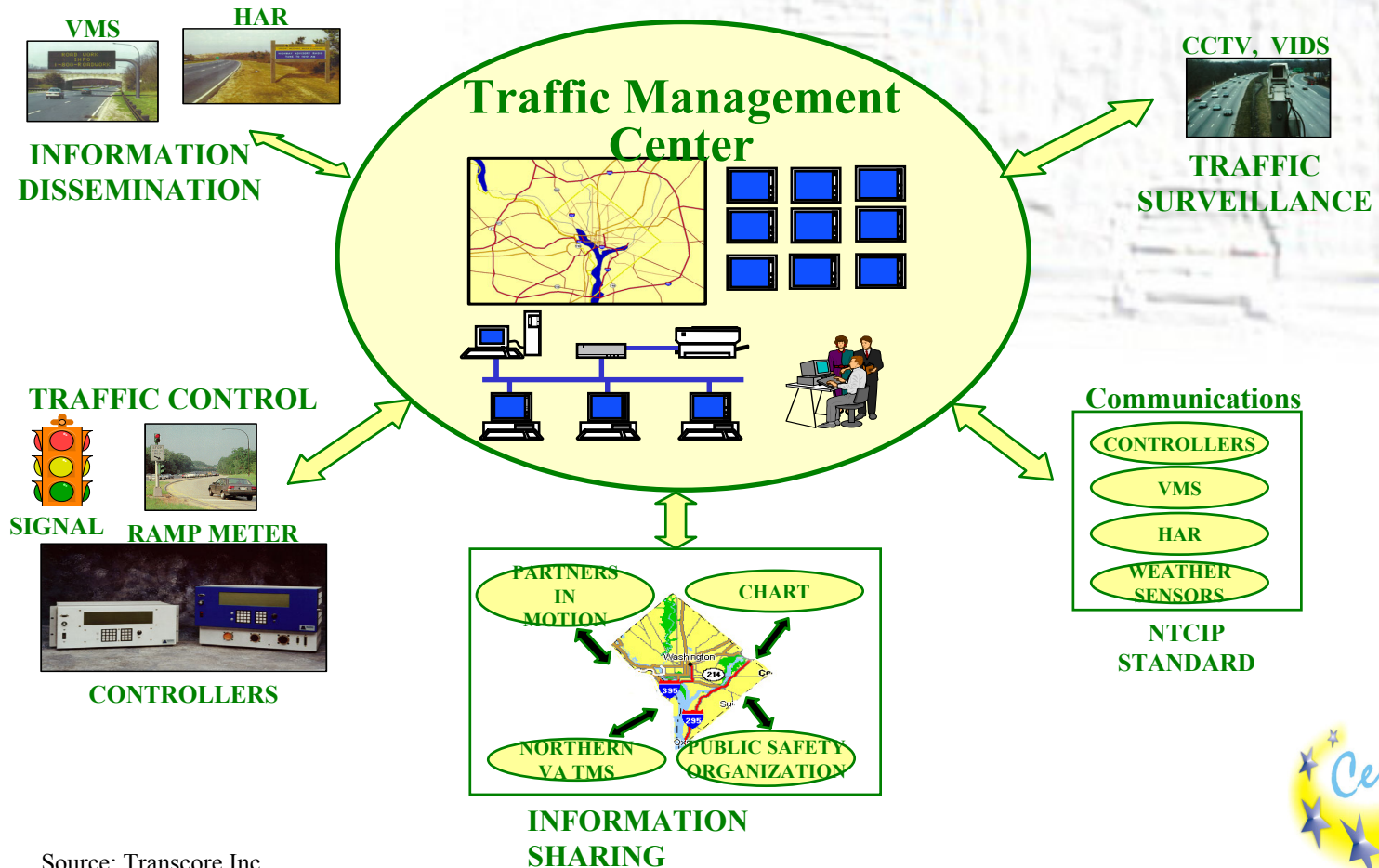




# Traffic Management Systems



# REGIONAL TRANSPORTATION MANAGEMENT



# Traffic Management Centres

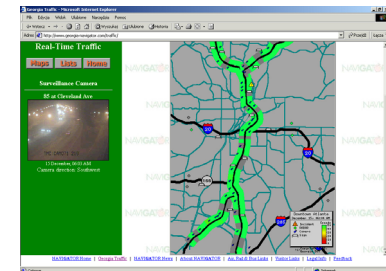


- Typical traffic management center requires a complex configuration of systems, workstations, video switching and displays, and audio communications components including telephone and radio systems,
- TMC designs are generally tailored to meet the specific operational needs of the regional or local operation plans.



# Functions of TMS

- Traffic Signals Control,
- Variable Message Signs
- Video Control
- Ramp metering
- Incident management/detection
- Traveller Information
- Personalized Traffic Services
- Information and management through Internet



# Benefits

- Lower number of accidents – VMS reduce number of accidents up to 30%,
- Less congestion and more efficient transport – improvement of existing infrastructure utilisation from 15 to 30%,
- Better environment,
- More people use public transport – lower congestion,
- Investing in ITS is much cheaper then building new roads,

Source: „Telematyka & telekomunikacja” no 1/01 – based on reports: „Institutional and policy framework...” and „Status and priorities for Telematics Applications ....” prepared within UE CAPE program




# Benefits

- Researches in USA:
  - VDOT, 1990: 25% reduction in delays, 26 % reduction in stops
  - ITE, 1992: from 60 to 100 liters of fuel saved by each US \$ invested in ITS
  - FHWA, 1982: 40% of fuel is wasted if traffic control is not optimised
  - California FETSIM, 1994: 58:1 = ITS profits/costs
  - Significant improvement within hardware maintenance

Source: National Highway Institute USA





# Vehicle Weight Enforcement



# Vehicle Weight Enforcement

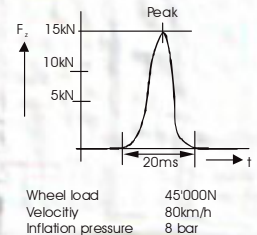
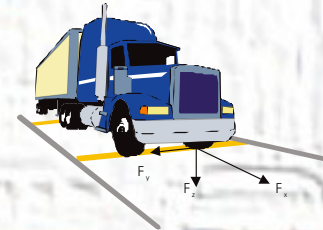
- Too heavy vehicles:
  - Safety hazard for pedestrians
  - Higher pollution
  - Higher noise
  - Damage of roads
  - Ruts – dangerous for drivers
  - Higher cost of road repairs



# High speed Weight-in-Motion

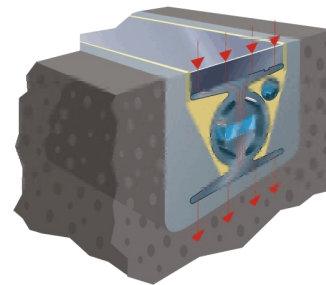
- Typical applications:

- Pre-enforcement selection
- Bridge overload protection
- Restricted area protection



- Technology:

- Piezo sensors, piezoceramic cables, bending plates or bending beams in pavement
- Roadside electronics
- Camera or terminal for users



LINEAS, accuracy of  $\pm 3\%$



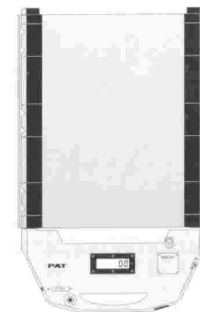
Source: Golden River Traffic

# Low speed Weight-in-Motion and Static Measurement

- Technologies used for enforcement:
  - Portable scales
  - Dynamic weighbridges
  - Combination of both



Source: Axtec and PAT



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# Conclusions

- ITS systems are widely used in USA, EU and other countries
- Increase safety and efficiency of transport
- Reduce environment pollution
- **ITS systems are the cheapest way to improve transport quality !!!**

