

**A German Research Initiative,
supported by the Federal Ministry of Education and Research**



Definition



INtelligenter **VE**rkehr = Intelligent Traffic

Use intelligent vehicles as components of an intelligent transportation network. Establish pre- and on-trip-information systems with universal information about all modes of traffic. Develop new guiding and control strategies based on principles of self organization.

Nutzergerechte **T**echnik = User-oriented Technology

Develop technical systems, which are to be used simply and intuitively, which can be adapted intelligently to the ability of the users, and which do not create new loads for the user.

Future road traffic requires new systems for driver assistance and traffic management, which

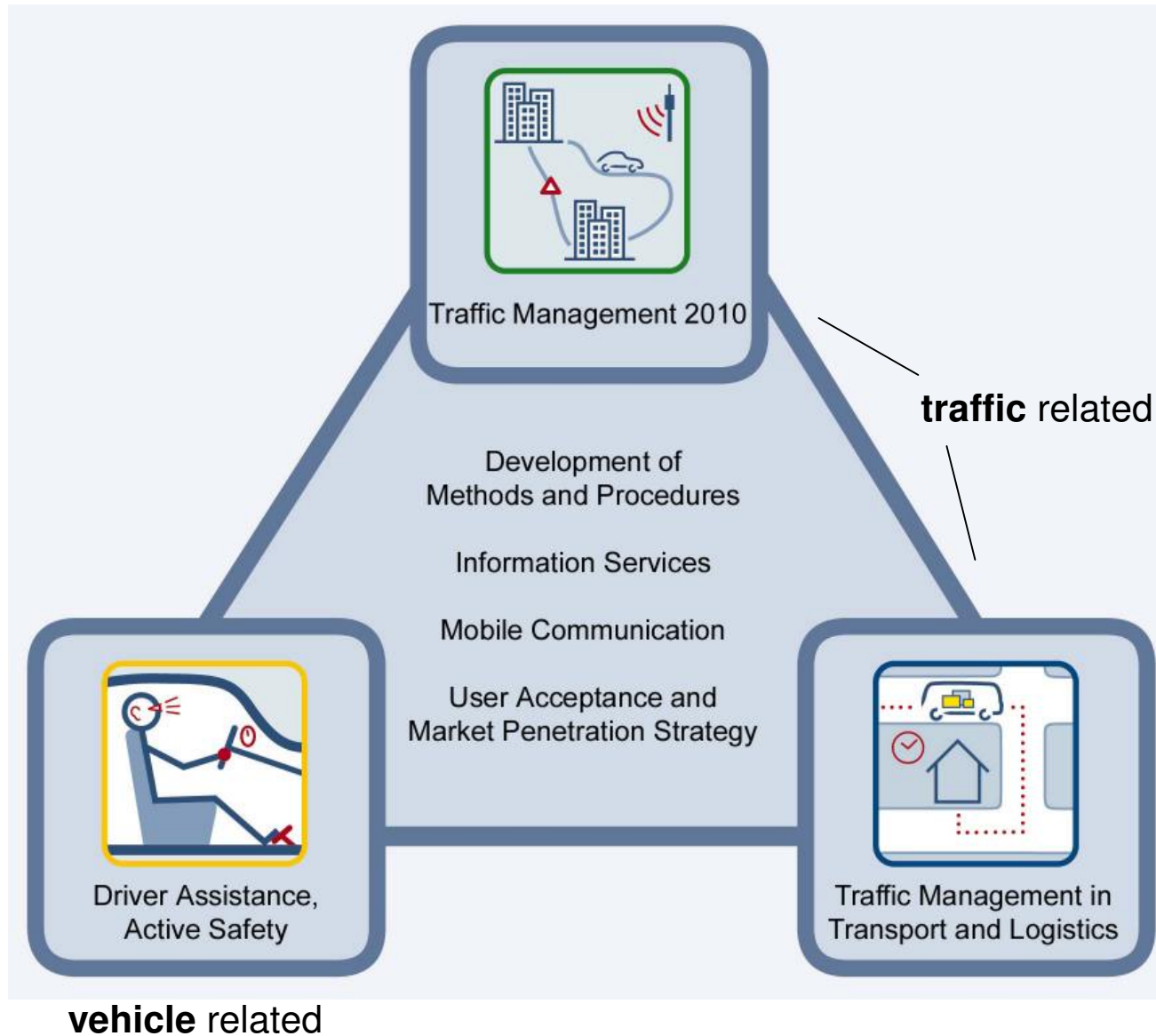
- **increase safety for all road users**
- **ease driver's load**
- **improve traffic efficiency and optimize traffic flow**
- **avoid traffic jams and use roads to capacity**
- **Self-organization of traffic by information in the traffic network**
- **make good economical and ecological sense and are legally approved**
- **are accepted by the user and the community**

Partners



Audi
Bosch
DLR
Ericsson
Ford
Hermes
IBM
MAN
Opel
PTV
Siemens VDO • Siemens AG • Siemens Restraint Systems
BMW • IFAK • Transver • Navtech • fka
DaimlerChrysler • Uni Köln • TÜV Rheinland
VW • Hella

The INVENT Projects



Driver Assistance, Active Safety



Detection and Interpretation of the Driving Environment



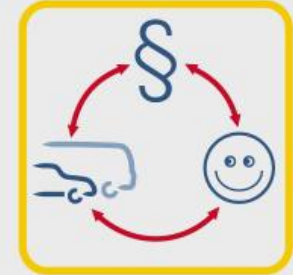
Congestion Assistant



Driver Behaviour and Human-Machine-Interaction



Anticipatory Active Safety



Traffic Impact, Legal Issues, and Acceptance



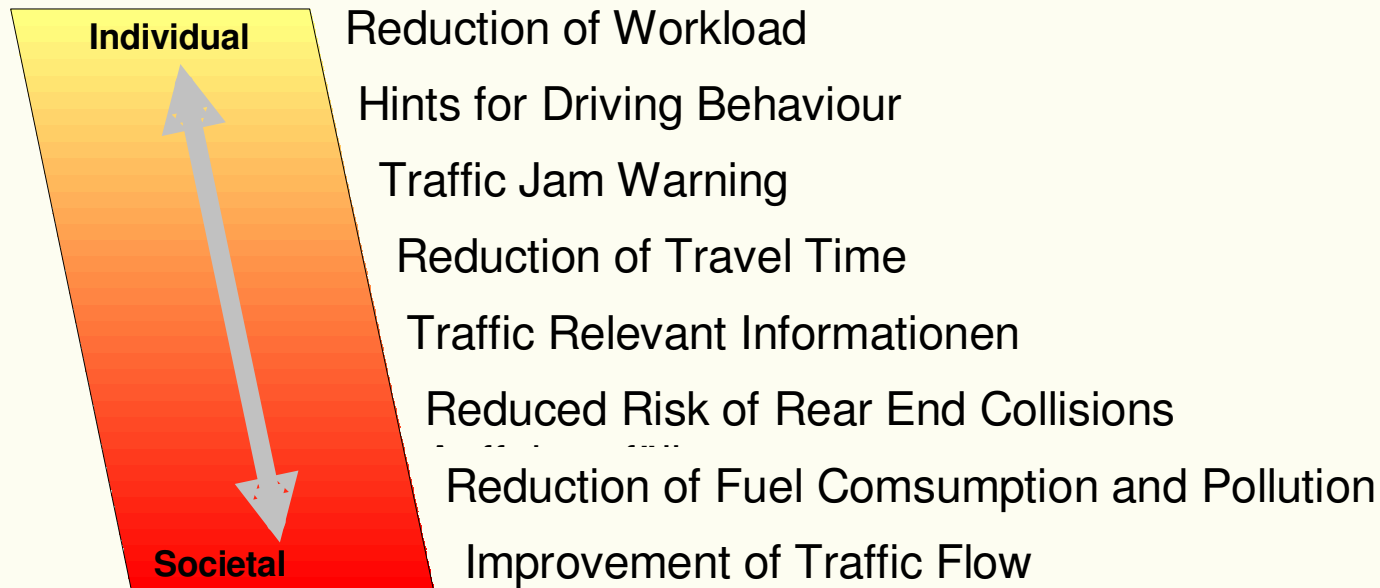
Congestion Assistant



Goal: Vehicle Guidance and Driver Assistance in Stop&Go Situations

- Autonomous Car Following in Low Speed Situations including Standstill, Lane Keeping
- Driving Behaviour Hints

Subgoals





Anticipatory, Active Safety



Goals



Development of Active Safety Systems in order to avoid or to mitigate accidents and to protect all road users

⇒ Focus: Rural Areas and Urban Traffic

Applications

- **Lateral Control Assistance**
- **Intersection Assistance**
- **Protection of pedestrians and cyclists**
- **Predictive control of vehicle dynamics**

➡ Feasibility Studies and Implementation of Selected Functions



Supplies Information about

- **Driver Behaviour**
- **Intuitive understanding and easy familiarization with assistance systems**
- **Impact of interaction with driver assistance and information systems on traffic safety**



Detection and Interpretation of the Driving Environment



Status quo:

- Actual Sensor Technology and Algorithms not sufficient for Driver Assistance Systems

Project Concept:

- Cooperation of Manufacturers, Suppliers and Research Institutes

Project Goal:

- Development of theoretical and practical knowledge for realisation of integrated systems for environmental sensing

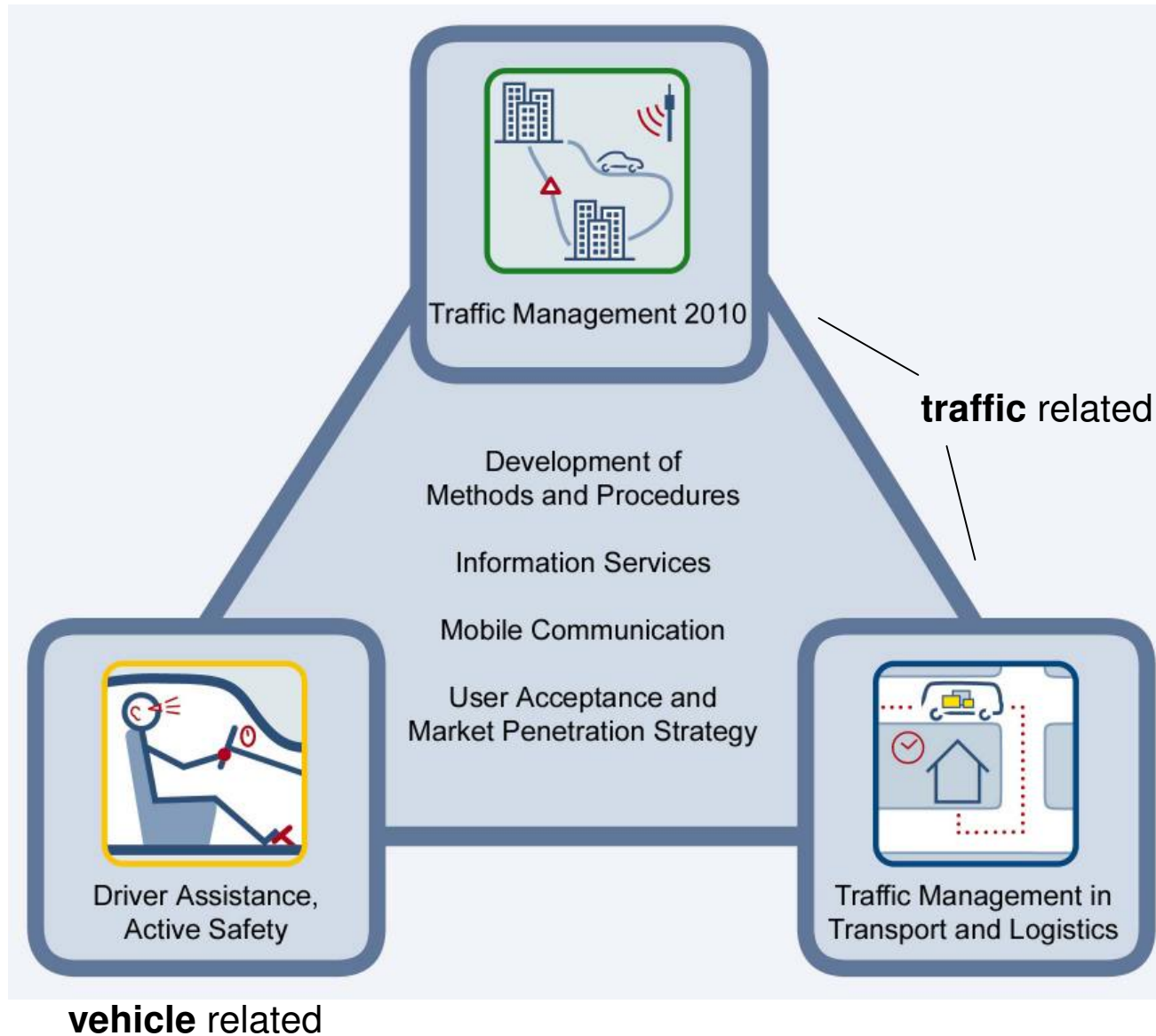


Traffic Impact, Legal Issues and Acceptance



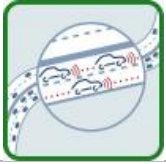
- **Traffic simulation for analysis of traffic impact**
- **Customer surveys and workshops**
- **Driving experiments on test tracks and tests in real traffic**
- **Analysis of legal conditions**
- **Cost-benefit analysis**

The INVENT Projects



Traffic Management 2010





Objectives

- Damping and prevention of stop-and-go waves
- Stabilization and smoothing of traffic flow by lane use planning and lane change assistance functions
- Dissipation of traffic jams by outflow increase, temporary diversion, and inflow reduction
- Better use of roadway infrastructure



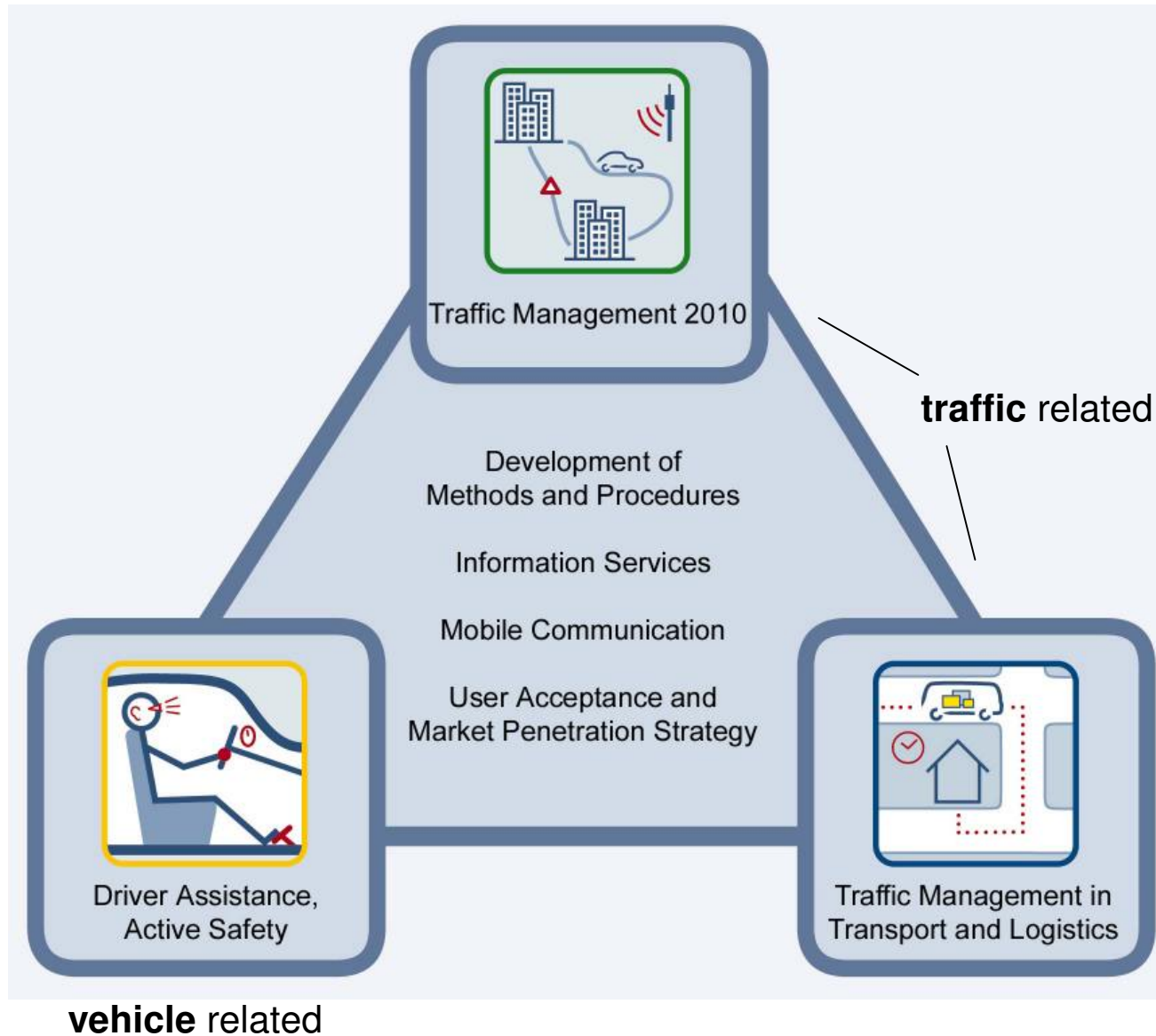
Traffic Network Equalization



Objectives

- Improving performance of the roadway network
- Utilizing existing traffic infrastructure more efficiently
- Improving modern route guidance systems
- Synthesizing individual and public traffic strategies into a single telematic service
- Creating a traffic knowledge base for decision support
- Exploring new directions for traffic data acquisition
- Demonstration of implementation in test sites

The INVENT Projects



Traffic Management in Transport and Logistics



Traffic Management in
Transport and Logistics

Development of Methods
and Procedures

Information Services

Mobile Communication

User Acceptance and
Market Penetration Strategy



Traffic Management in Transport and Logistics



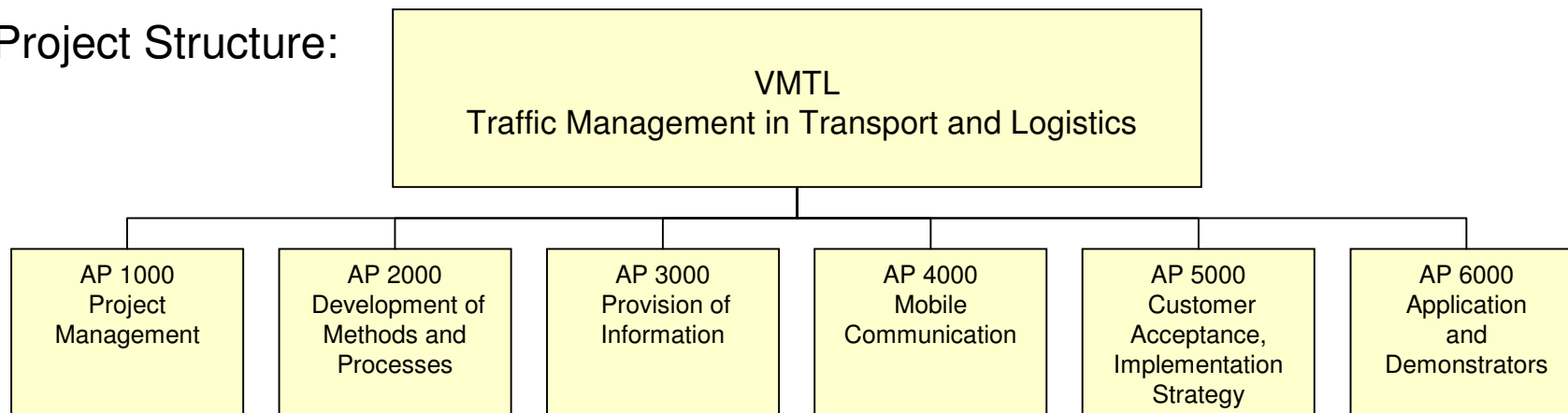
Project Partners:



Duration: October 2001 - May 2005

Project Budget: ~ 9 Mio € (VMTL) (Total INVENT: ~ 39 Mio €)

Project Structure:





Traffic Management in Transport and Logistics



Solution Approaches

- Development and implementation of intelligent services and tools for transportation and logistics
- Evaluation and analysis of new architectures and services
- Distinguish two planning horizons: Scenario 2005 and Scenario 2010
- Demonstration of new system concepts and services

Objectives

- ⇒ **Improve transport efficiency in delivery of goods**
- ⇒ **Dynamically optimize the utilization of transport routes, delivery vehicles, delivery period, mobile communication, computing resources**
- ⇒ **Establish new opportunities for monitoring and controlling the transport of goods**



Traffic Management in Transport and Logistics



E.g. about 4 million unsuccessful delivery attempts per year by Hermes Versand Service only due to:

Wide delivery time windows:
e.g.: am/pm

Static
(Tour) Planning

Fixed delivery locations

Limited Communication between Depot and Driver

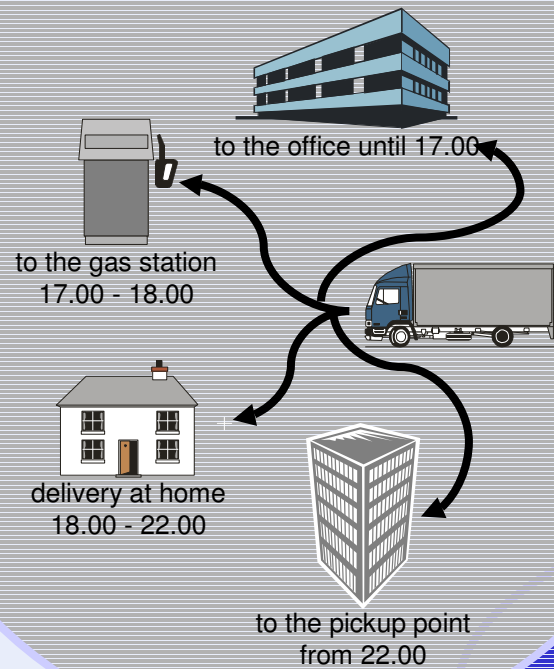
- Consignee is not available at home
 - Delivery at the neighbors's
 - Consignment must be delivered again the next day
- Route optimization depends on the driver (experience, knowledge of delivery area)
- No anticipatory reaction to traffic problems
- Customer's preferences are not taken into consideration
- No active control of the driver in case of new additional orders / order cancellations
- Transfer of order status data after the tour only



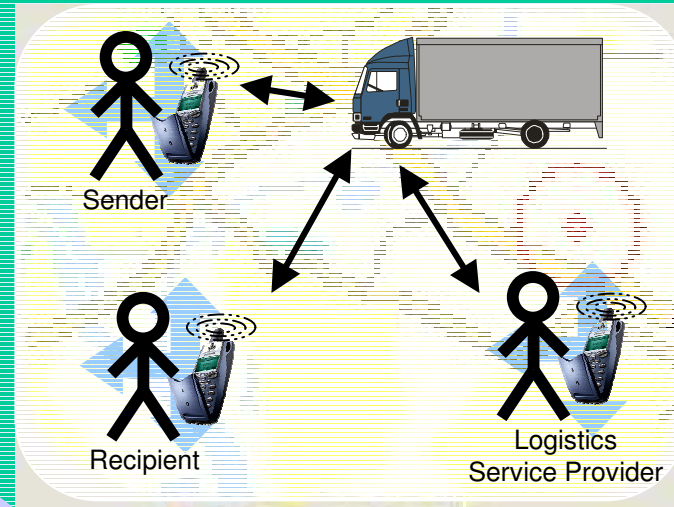
Traffic Management in Transport and Logistics



Flexible Delivery Locations



Active Control



Other Services

- Customer information
- Collection of Floating Car Data (?)

Scenario 2005



Traffic Management in Transport and Logistics



Flexible Places of Delivery

- Higher rate of successful deliveries
- Avoidance of returns of undelivered goods
- Enhancement of customer service and customer satisfaction

Active Control

- Avoidance of redundant delivery journeys
- Higher degree of utilization
- Tour adjustments to changing conditions

Other Services

- Enhance the service level of the logistics service provider
- Enable flexible places of delivery and active control

Scenario 2005

**Thank you for
your attention !**