









Cooperative Systems Applications supporting policy goals

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Transportation

London 1960



London 2000





- Personal mobility doubled from 1970 to 1998
- x Traffic jams very day on 10% of Europe's highway network
- x Delays cost 1.9 billion litres of fuel (6% of annual consumption)
- x Congestion costs €50 billion per year (0,5% of EU GDP)
- x Road transport takes 26% of total EU energy consumption
- x Emissions from ground bases transport 20% of cities' GHG
- x 1.4 million road accident cost €200 billion each year...


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Urban transport policy goals




- Efficient movement of people and goods (not vehicles)
- Safe roads for all road users
- Minimum congestion (free flow)
- Clean environment (emission, noise, livability)
- Smooth local freight transport (economy)
- Good accessibility for all (equity)

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Solution space





- More infrastructure (increase supply)
 - More roads, more lanes, more alternative modes
- Less vehicles (decrease demand)
 - Modal shift to public transport, cycling, walking, ride sharing
 - Substitute for trips (e.g. work at home)
- Better use capacity (balance supply-demand)
 - More intensive use of existing infrastructure
 - e.g. more use of other modes; bus, bike, etc.
 - e.g. behavioral changes; speed, route, etc.
 - e.g. control changes; adaptive, predictive, etc.
 - ITS: Intelligent vehicles, Intelligent infrastructure

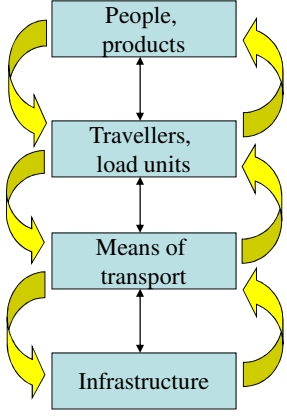
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Transport system








travel market:
need to travel & value of travel

transport market:
transport mode performance & modal choice


traffic market:
traffic system performance and traffic demand

- Balance supply and demand require choices and management

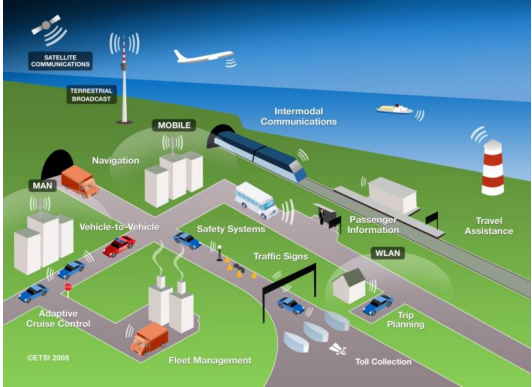
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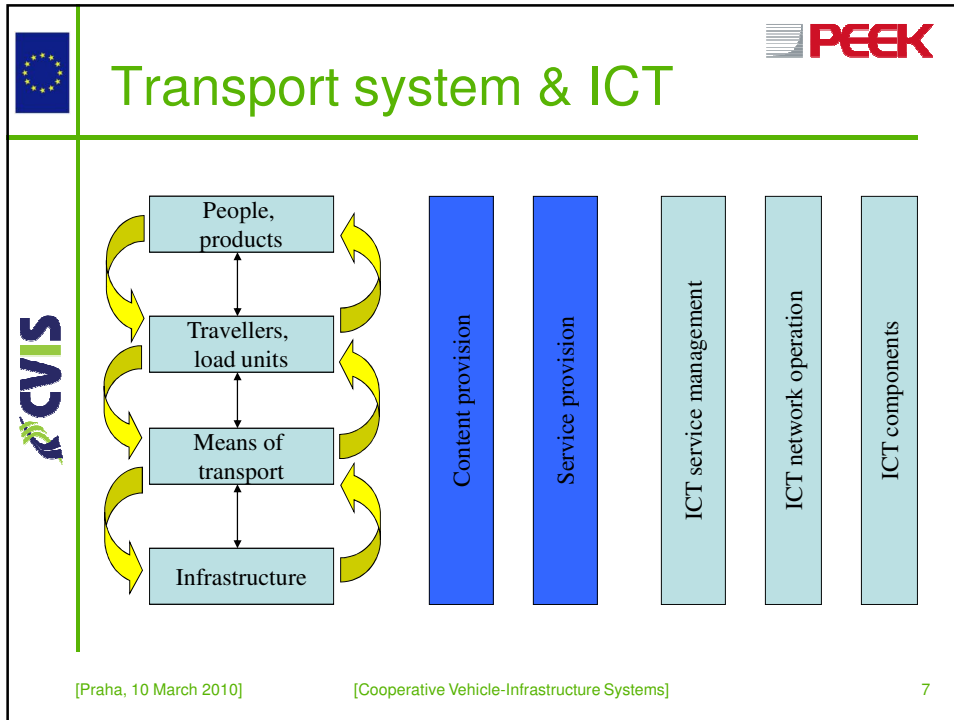
ICT and Transportation



- Vision: more information = better management and better decisions
- Goals:
 - Smoother
 - Safer
 - Cleaner
 - Comfortable
- Communication = Cooperation



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Traffic safety







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Defining 'cooperative'

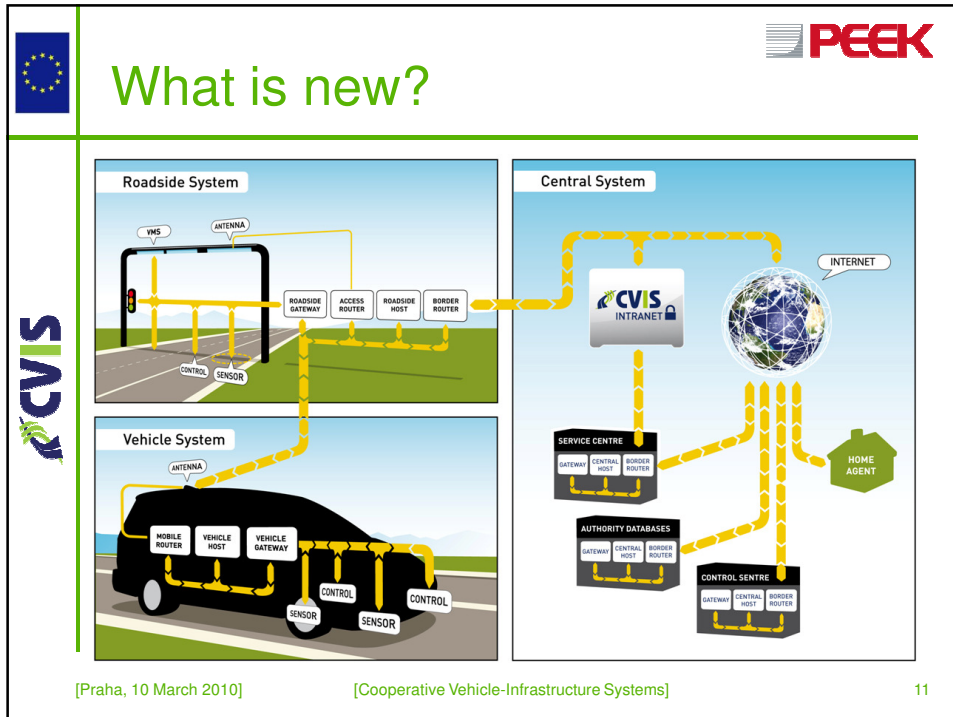


- Literally: 'working together'
 - Joint activity of: vehicles, infrastructure and center
- Principal elements:
 - Mix of technology, people and organizations
 - Communication; sharing information commonly
 - Coordination; action/control to reach shared gain/goal
- Balanced optimum for operator and user

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A traffic light example




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A traffic light example



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Objective of cooperation

Road authorities / operators
 Safety, throughput and reliability from
Collective interest
 Focus on the road side infrastructure

Intervention

Informing

Advise & warning

Guiding

Private sector
 Safety, reliability and comfort from
Individual interest
 Focus on vehicle or nomadic device


- Variables: goal, area, target group, operation level, system location, strategy

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Cooperative Applications for....

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... better public transport







- Priority Application
 - Green priority at signalled intersection
 - Feedback to driver



- Real-Time Travel Information (RTTI)
 - Before and during the trip
 - Covering multiple modalities
 - Connections and alternatives in case of delay

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Public transport examples








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... less congestion







- Routing application
 - Strategic: network based guidance from center
 - Micro: traffic light based guidance from infrastructure
- Speed advice
 - Smoother traffic for green waves (also improving safety and environment)
- Information application
 - On-trip traffic information to improve choice behavior
- Loading bay management
 - No waiting times for freight vehicles

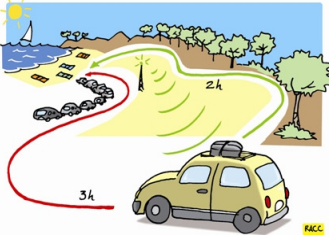
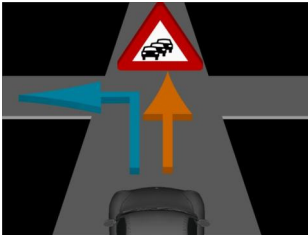
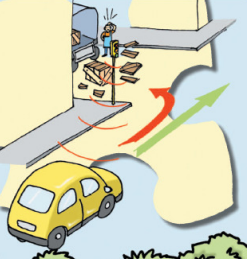
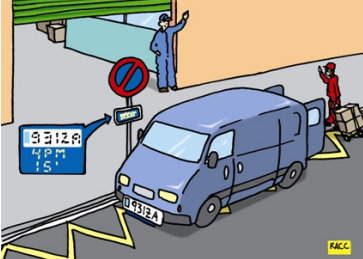

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Congestion examples






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... increased traffic safety



CVIS

- Intersection safety
 - Hazard warning; vulnerable road users, red light violation, right of way violation
- Speed alert
 - Safe speed; curves, schools, pedestrian crossings
- Assistance of emergency vehicles
 - Green priority, all red or safety warning other road users, feedback to driver
- Ghost driver warning
 - Hazard warning for ghost driver and other road users

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Safety examples





CVIS













... other benefits




- More and better traffic data available through 'floating car data'
- Less emissions;
 - More comfortable public transport
 - Smoother traffic flows
 - Less freight kilometres driven
- More effective implementation, monitoring and evaluation of policy objectives

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Consideration



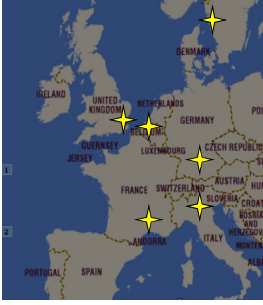
- These were only a few examples
- Cooperative technology provides the means; the range of application is almost unlimited
- Today's best examples: TomTom navigation, online traffic information, iPhone App-store
- What 'apps' can you think of ([see 'Eddie'](#))?

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Test videos




Over 20 locations:

- Netherlands-Belgium
- Germany
- United Kingdom
- France
- Italy
- Sweden

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What are the gains?

- Safety benefits are not easy to determine
 - C/B-ratio >1; every casualty counts
- Efficiency benefits ranging from 10 to 40 %
 - How general are these findings?
 - What about large scale implementations?
- Environmental benefits ranging from 5 to 25 %
 - Which indicators are used?
 - And under which conditions?
 - Which strategy is used?

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See you in Amsterdam!



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