

# Themes for future trans-national Transport research programming

Minutes from the policy seminar  
March 3<sup>rd</sup> and 4<sup>th</sup> 2005 in Den Hague

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## 1. Introduction

The ERA-NET TRANSPORT (ENT) research programme is a joint effort of 11 European countries to promote efficient trans-national research co-operation in the field of transport. Until now transport research and networks have been seen from a national perspective. ERA-NET TRANSPORT aims at developing a European vision on transport research.

One element of ERA-NET TRANSPORT is to collect relevant information concerning topics and themes for future trans-national transport research programmes in order to develop joint research programmes for the period 2006 - 2010. This is being done in 2004 by means of a Delphi survey. Over 25 European transport experts and professionals participated in two questionnaires and one workshop to identify and specify these topics and themes.

The Delphi survey tried to produce a prioritized list with research areas in which several European countries want to cooperate. The list was generated in several phases, first asking experts from different countries about trends and policy areas that they find important for the long term and for which research is needed. In a second phase this list was concentrated around priority themes and the experts were asked to give their ideas about important policy tools, to be developed in trans regional research. In the third phase a focus was made in the wide range of research issues.


The results of this Delphi survey are put forward for discussion in the Policy Seminar "*Themes for future trans-national transport research programming*" on March 3<sup>rd</sup> and 4<sup>th</sup> 2005. During the Policy Seminar a reflection was made to the national long-term (research) policy strategies and other international (research) programmes from the European Commission, relevant Technology Platforms, the Joint Transport Research Centre, etc.

In total 8 of the 9 possible research areas identified in the Delphi survey were discussed, based on introducing presentations of countries within the ENT programme, during the Policy seminar:

- Decision support systems
- Infrastructure provision
- Integration of transport systems
- Land-use planning
- Pricing and taxation
- Regulation and deregulation
- Transport and infrastructure management
- Vehicle technology

The 9<sup>th</sup> possible research theme, Information and awareness, was not being discussed. The responsible country for presentation was not able to reach the Dutch airport Schiphol, because of very bad weather conditions. The presentation on this research theme is included in the final appendix of this report. Also other countries suffered from the bad weather conditions. In the end only the Swedish representatives could not reach, next to the Finnish, the Policy Seminar. Representatives from other countries came in partly with delays.

In the next chapters (2 until 10) the participants, introducing presentation, reflection of the discussion and the results of a prioritisation of interested research elements for each research theme will be presented. This information is



being gathered in parallel sessions. Chapter 10 presents the results of the plenary discussion and prioritisation, based on the outcome of all parallel sessions. Appendix 1 presents the agenda of the Policy Seminar.

The outcome of the Policy Seminar will guide the final selection of the transnational research themes that will be worked out by the ERA-NET TRANSPORT programme in 2005 and 2006 during several meetings with research programme managers.

The participants in the policy workshop were the decision makers in strategic transport research programming in ENT countries: managers in the Ministries and National research bodies, that are responsible to develop the long-term transport research strategies and are able to identify the relevant research programme managers to participate in the following ERA-NET TRANSPORT Exploratory workshops (EWS). Appendix 2 presents the list of participants in the Policy Seminar.

## 2. Plenary session

### Opening

The chairman of the Policy Seminar, Hans Jeekel, opened the meeting and welcomed all participants. He presented the structure, objective and aim and intended output and outcome of the Policy Seminar (this is already described in the previous chapter: Introduction).

Ad van Ommen presented the general structure of the ERA-NET TRANSPORT programme.

### Results of WP1, WP2 and WP3 (Work Packages)

Because of the absence of the representative of WP3 and the delay of the representatives of WP1 Sieds Halbesma presented the results and future activities, related to the Policy Seminar, of the Work packages 1-3.

### Results of Delphi seminar and questions for identifying ENT themes

Henk van Zuylen presented the goal, structure and conclusions of the Delphi survey. The themes that were identified as the most important to focus on in future research initiatives were:

- *Equity and Accessibility*, as an ageing population, social exclusion, the secondary effects of road pricing and the reduced urban accessibility will grately influence the mobility paterns of the future.
- *Economic development* is related to significant changes are emerging in regulation and market development, for example higher transport pricing and the strong dependency on oil in the transport sector.
- *Safety and Security* is an important topic for future transport research especially issues as perceived safety, the need to protect the most vulnerable users and to avoid negative consequences of technological innovations.
- *Efficiency* of transport systems need to be heighten through standardisation of different components, e.g. rail, pricing, a better use of spare capacity.
- *User satisfaction*, will be more in focus in the future, and can be a way to improve public transport by including user quality in public transport contracts.
- *Environmental issues* such as air quality, noise pollution and CO<sub>2</sub> are very serious traffic related problems that deserve more attention. The technology seems to be available, but the introduction in practice requires more attention.

In a concluding analysis, the policy-objective oriented results of the Delphi survey were related to the policy-instruments oriented research areas that could form the basis for discussion in the Policy Seminar.



### **3. Decision support systems (parallel session)**

#### **Participants of the session**

Pascal Bain (FR), Kjell Rosanoff (N), Gerard Offermans (NL), Sieds Halbesma (NL), John Collins (UK), Pieter-Jan Bouwmeister (NL/Chair), Jos Koene (NL/notes)

#### **Definition of the research area**

Methods and tools used by policy makers in:

- Transport studies (interaction between infrastructure and services and the demands placed on them);
- Impact studies providing the environmental, safety and socio-economic impacts of transport policies and projects;
- Ex-ante, on-going and ex-post evaluation studies of transport policies and projects; and
- The monitoring of transport systems.

#### **Introducing presentation by United Kingdom (by John Collins)**

##### *Decision making process*

UK decision making framework is the 'New Approach to Appraisal' - NATA (see [www.webtag.org.uk](http://www.webtag.org.uk))

- NATA Process includes:
- Objective setting
- Consultation/Information used to generate options
- Identification of problems
- Option testing and appraisal
- Modelling should underpin the appraisal

##### *Important policy objectives*

NATA based on five Criteria/Objectives:

- Integration; Transport interchange, Land Use Policy, other Government Policies
- Safety; Accidents, security
- Economy; Public accounts/business/consumers (CBA), Reliability, Wider Economic Impact
- Environment; Noise, Local Air Quality (LAQ), Greenhouse gas, Landscape, Townscape, Heritage, Biodiversity, Water, Physical fitness, Journey Ambience
- Accessibility; Option Values, Severance, Access to the transport system

##### *Important inputs to the appraisal*

The Appraisal is underpinned by modelling which:

- For simple schemes used fixed trip matrix: No 'induced' traffic effects,
- Most analysis requires variable demand: Convergence between demand and supply Models, Multi modal modelling as necessary, Land use / transport interaction modelling

Option		Description	Problems	Present Value of Costs to Public Accounts £m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
ENVIRONMENT	Noise			net properties win / lose
	Local Air Quality			Concs wtd for exposure
	Greenhouse Gases			tonnes of CO <sub>2</sub>
	Landscape			Score
	Townscape			Score
	Heritage of Historic Resources			Score
	Biodiversity			Score
	Water Environment			Score
	Physical Fitness			Score
	Journey Ambience			Score
SAFETY	Accidents			PVB £m
	Security			Score
ECONOMY	Public Accounts		Central Govt PVC, Local Govt PVC	PVC £m
	Business Users & Providers		Users PVB, Providers PVB, Other PVB	PVB £m
	Consumer Users			PVB £m
	Reliability			Score
	Wider Economic Impacts			Score
ACCESSIBILITY	Option values			PVB £m
	Severance			Score
	Access to the Transport System			Score
INTEGRATION	Transport Interchange			Score
	Land-Use Policy			Score
	Other Government Policies			Score

The Appraisal summary table provides a summary of the Appraisal outputs:

#### *Important trends in the UK*

Main trends that need to be accounted for in the appraisal and modelling processes:

- Continuing GDP Growth.
- Population / Household Growth
- Technological issues – various (e.g. working at home possibilities, improved car technology)

#### *Important research programmes*

- Reliability – valuation and incorporation into modelling framework;
- Monetisation of environmental impacts (noise/LAQ/etc.);
- Improve understanding of Variable Demand responses (ongoing research monitoring);
- Value of time – distributional issues/pricing
- Further land use transport interaction research to support modelling.

#### *Main research questions*

- Environmental values - rigour and acceptance;
- Reliability - DfT research;
- Responses to prices – both user charges and fuel prices;
- Weighting – balance of objectives

### *Suitable elements for supranational / international co-operation*

- Establishing environmental values
- Reliability research (methodology and valuation)
- Good practice in modelling (urban/interurban)
- Time of day choice (peak spreading)

## **Discussion**

### *Joined and additional research elements*

After the introducing presentation the participants were asked to write down interested research elements for their own country 1) similar and 2) additional to the suggested research elements. After having made the inventory of all new research elements questions for transparency and discussion on relevancy for ERA-NET TRANSPORT started up. Finally each attending country was asked to make their (limited number of) priorities in the overall list. The next table presents the results of the joined and additional research elements and the priorities given to it by the countries.

<b>Interest in cooperation on suggested elements by UK</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Good Practice in modelling (Urban/ Interurban)	NL	
Necessity to take steps from infra projects to policy decision support	N	N
Transport urban interactions modelling	F	
Time of day choice	UK	
Reliability research	UK	
Environmental issues: Methods and acceptance, rather than values as such	N	
Establishing environmental values: monitorisation and evaluation of impact/models	FR	UK, F, N,

<b>Interests in co-operation on additional elements</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Technical versus political decision making	NL	
Acceptance of policy schemes	N	F
Tools for decision makers to evaluate social acceptance of innovations	F	

### *Discussion points*

In general the participants agreed that Decision support systems is an important research issue.

- Transport studies should be performed in order to obtain a better knowledge of economic impacts. Further more evaluation studies are needed in order to measure improvements.
- There is a missing link in DSS versus policy objectives, for instance environmental effects. Policy maker should steer towards really hard decision making by decision makers based on data collected and provided

through research. This leads inevitably to reducing risks by wrong decision-making, as long as proper tools are being used.

- Better knowledge of the reliability of travel time requires further research and improvement.
- Reliability of public versus private transport is not mentioned. One looks to it in different ways. It's high on the UK agenda. Norway and France refer to the reliability of freight transport.
- It is important to understand the reason why car users won't accept certain measures.
- What is the value of DSS? It is just a part of the policy making process.

#### **Prioritised research elements**

1. Establishing environmental issues
2. Research of reliability (esp. travel time)
3. Good practice in modelling
4. Time of day choice

## 4. Infrastructure provision (parallel session)

### Participants

Heimo Kropf (A), Thilo Petri (D), Sylvie Niessen (F), Gerard Offermans (NL), Anna Klaczka (P), Matthew White (UK), Henk van Zuylen (NL/Chair), Daniëlle de Bruin (NL/Notes)

### Definition

Planning, financing, design, construction, operation and maintenance of transport infrastructures for all modes. Includes both physical networks and information and communication networks.

- Physical networks include the right of way and the facilities at the access/egress points and at the points where modal transfers occur.
- Information and communication networks support the management of traffic flows and the provision of information. The development of interoperable 'Trans-European Networks' (TENs), covering all modes, is a key part of the EU transport strategy.

Introducing presentation country by Sweden (developed by Hans Ingvarsson, presented by Henk van Zuylen)

### *Important trends in Sweden and Europe*

In the Programme for Knowledge and Innovation Within the Road Transport System, the Swedish Road Administration has analysed and described the needs for RDD as 19 Development Areas (DAs). These are:

- Current and future requirements and needs (DA 1)
- Individuals in harmony with the transport system (DA 2)
- Towards a long-term sustainable transport system (DA 3)
- Road network for sustainable growth (DA 4)
- Safe and sustainable road infrastructure (DA 5)
- Increased efficiency and acceptance in the planning process (DA 6)
- More efficient production process – production technology development (DA 7)
- A city for all (DA 8)
- Safer and improved environmental characteristics of vehicles (DA 9)
- Improved accessibility to road and traffic information (DA 10)
- Better cooperation within the road transport sector (DA 11)
- More efficient road traffic management and road-user information (DA 12)
- Safer and more sustainable operation of the road network (DA 13)
- IT infrastructure within the SRA to promote cooperation (DA 14)
- Improved management by objectives and targets – annual follow-ups (DA 15)
- Development of the SRA as an attractive and competent employer (DA 16)
- Efficient information and communication to support other activities (DA 17)
- Development of the role as a purchaser and client (DA 18)
- More and better roads for capital invested in a healthy sector (DA 19)

These “dots” are primarily relevant to “Infrastructure Provision” in a wide sense are CURSIEF.

In the *Strategic Research Agenda Overview*, published in October 2004 by the *European Road Transport Research Advisory Council (ERTRAC)*, the following challenges or trends are relevant as far as "Infrastructure Provision" is concerned.

- Accessibility for people of all ages, incomes and physical abilities.
- Roads and infrastructures that are built, upgraded, monitored, maintained and inspected to high standards.
- Use of new materials and technologies.
- Efficient utilization of the existing road network.
- Integrated land-use and transport planning.
- A road infrastructure that is easily understood and forgiving.
- Intelligent roads and vehicle systems that interact and communicate with each other.
- Infrastructure minimising the safety risks for vulnerable road users, i.e. pedestrians and cyclists.
- Resilient networks, i.e. that are safe, secure and reliable.
- Minimising road traffic congestion ending up in reducing the energy consumption and increasing mobility.
- Reduction of road traffic noise.
- A more efficient use of resources and energy by increasing the extent of re-use and recycling.
- Cleaning and protection to reduce the environmental impact of the surface run off of water.
- Infrastructure planning aimed at minimising environmental impacts on communities and natural habitats.
- Road infrastructure designed with respect to minimising Life Cycle Cost (LCC), i.e. Asset Management.
- Road infrastructure design based on a Life Cycle Analysis (LCA) with respect to environmental effects.
- Reliable infrastructure network, i. e. how to achieve a robust network.
- New forms of infrastructure investments.
- Performance models and optimisation tools that supports appropriate Asset Management
- Promotion of innovative construction and strengthening techniques

#### *Important policy objectives*

Those policy objectives that are set up by the Swedish Parliament seem to have relevance to whole Europe. These objectives are as follows: The overall goal for transport policy is to safeguard the provision of socio-economically efficient and sustainable transport for individuals and the business community throughout the country. This main objective contains the following subsidiary objectives:

- Accessible transport system
- High transport quality
- Safe traffic
- Good environment
- Positive regional development:
- A transport system for gender equality

### *Important research programmes*

The Strategic Research Agenda Overview, published in October 2004 by the European Road Transport Research Advisory Council (ERTRAC).

- The Programme for Knowledge and Innovation Within the Road Transport System published in 2003 by the Swedish Road Administration

### *Main research questions*

The key questions are how to provide a road and information infrastructure that contributes to:

- Safety and Security
- Positive or less harmful environmental effects
- Increase of both mobility and accessibility
- Efficient use of public money

Another question is how to more efficient implement results from R&D activities. In the latter respect the importance of standardisation must not be neglected.

### *Suitable elements for supranational / international co-operation*

As far as the policy objectives are similar between different countries and the EU, all research and development activities that contribute to these objectives are potential elements for co- operation.

## **Discussion**

### *Joint and additional research elements*

After the introducing presentation the participants were asked to write down interested research elements for their own country 1) similar and 2) additional to the suggested research elements. After having made the inventory of all new research elements questions for transparency and discussion on relevancy for ERA-NET TRANSPORT started up. Finally each attending country was asked to make their (limited number of) priorities in the overall list. The next table presents the results of the joined and additional research elements and the priorities given to it by the countries.

<b>Interest in co-operation on suggested elements by Sweden</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Use of information in real time	UK	A, UK, D, F
More efficient road traffic management and road user information	NL	F
Efficient road traffic information (user * managers)	F	-
Safe and sustainable road infrastructure	D	-

Interest in co-operation on additional items	Introduced in by country	Prioritised by county in second round
Low impact maintenance techniques	UK	-
Forgiving infrastructure (safety)	UK	-
Self enforcing infrastructure	UK	UK
Long life infrastructure	UK	UK, D
Value for money, LCA, from planning - renewal	NL	NL,
Infrastructure planning/environmental aspects, ecosystems (common criteria of impact assessment)	F	-
Minimising impacts on environment and people	D	NL, A, D
Silent asphalt	D	A

*Clarification and explanation for subject where necessary:*

Netherlands

Value for money, LCA, from planning – renewal: more value for money can be obtained if one makes one contracts for all elements: building, management, maintenance

UK

- Use of information in real time: This is particularly useful in public transport. Infrastructure is a source for many data and information
- Forgive infrastructure (safety): How can we include safety in road – design? And how do we minimise the effects of a mistake?

France

- Infrastructure planning/environmental aspects, ecosystems (common criteria of impact assessment): Planning management is difficult if you want to include also the ecological aspects. Standards for impact studies are necessary, as well as common criteria for impact assessment.

*Discussion points*

There was a high level of agreement in general.

Discussion within the subject “minimising impacts” focussed on (1) forgiving infrastructure and (2) low impact maintenance techniques.

**Prioritised research elements**

1. Use of information in real time
2. Minimising impacts on environment and people
3. Value for money / long life infrastructure.

## 5. Integration of transport systems (parallel session)

### Participants

Andreas Dorda (A), Heimo Kropff (A), Ernst Pucher (A), Tobias Thomae (D), Sylvie Niessen (F), Kjell Rosanoff (N), Mario Fruianu (NL), Sieds Halbesma (NL), Marek Sitarz (P), Anna Klaczka (P), Matthew White (UK), Pieter-Jan Bouwmeister (NL/Chair), Jos Koene (NL/Notes).

### Definition

Integration of modes into the logistic system is the objective of

- the first related concept is 'Intermodality': the movement of cargoes in the same loading unit/vehicle by successive modes of transport without handling the goods themselves when changing the modes
- the second related concept is "Interoperability": a term that describes the degree of harmonisation of two or more (sub-) systems to work together

### Introducing presentation based on the results of the Delphi survey (by Sieds Halbesma)

#### *Important trends*

- Increase in trade within the EU gives rapid increase in freight transport volumes
- Division of work, increase in productivity and raise in private consumption in the new EU member states gives rapid growth in passenger transport
- Changing way of pricing
- High value of time for passenger transport
- More demanding customers (transport users)
- Calculating users want even more quality
- Decreasing accessibility for people without car decreases
- Increased awareness of citizens of environmental problems
- Unreliability begins to come more important than congestion
- Congested infrastructure (roads, rail, airport and terminals), increased focus on efficient utilisation (pricing ITS etc) improvements in bottlenecks, etc.

#### *Main research questions*

- Integration of transport management and land use policy; model for land use/transport
- Interoperability of rail; European safety & control
- Acceptable safety levels for the introduction of new transport systems
- Less interchanges between modes
- Interoperability of rail: systems allowing competition

## Discussion

### *Joined and additional research elements*

After the introducing presentation the participants were asked to write down interested research elements for their own country 1) similar and 2) additional to the suggested research elements. After having made the inventory of all new research elements questions for transparency and discussion on relevancy for ERA-NET TRANSPORT started up. Finally each attending country was asked to make their (limited number of) priorities in the overall list. The next table presents the results of the joined and additional research elements and the priorities given to it by the countries.

<b>Interest in co-operation on elements suggested by the Delphi results</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Safety new transport systems	UK	
Easy interchange between different modes Seamless interchange	N UK	UK, NL, N
Integration of transport management and land use	F, N, P, A, NL, D	F, NL, P
Interoperability of rail; systems allowing competition	A	A

<b>Interests in cooperation on additional items</b>	<b>Introduced by country</b>	<b>Prioritised by county in second round</b>
Info management + info exchange Mobility management	UK A	N, UK, F, P, D, NL, A
Multi modal freight transport systems Integrated logistic system for better freight transport within Europe	F D	N, P, F, UK, D
Integration passenger/tourist info system	D	
Consider other transport modes for inter operable model beyond rail.	A	A

### Discussion points

- The participants supported the presented results of the Delphi in general the element of “Less interchanges” was added by “Easy interchanges”
- Several additional items were brought in by the countries, which did not started up much discussion. The session came rather quick to the prioritising of research elements.

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### **Prioritised research elements**

1. Mobility management
2. Multimodal freight transport systems
3. Integration of transport management
4. Easy interchanges between modes





## 6. Land use planning and transport (parallel session)

### Participants

Thilo Petri (D), Sylvie Niessen (F), Gerard Offermans (NL), Anna Klaczka (P), Matthew White (UK), Henk van Zuylen (NL/Chair), Daniëlle de Bruin (NL/Notes)

### Definition

Focus on:

- Land use patterns, which generate the demand for transport
- Development density to reduce transport demand
- Land use patterns designed to encourage the provision and use of public transport
- Matching of the impact of developments with the traffic they generate (development control)

### Introducing presentation by Germany (by Thilo Petri)

#### *Important trends in Germany*

- Decreasing financial capability of municipalities due to declining tax incomes; Less capacities for maintenance of transport systems and infrastructure
- Suburbanization, increasing consumption of land for housing, industry & transport; Higher need for transportation. Less utilization of transport infrastructure. Difficult accessibility by public transport
- Ongoing expansion of transport infrastructure; Rising public budgets deficits and further commitment for maintenance and investment in the future
- Tendency of a differentiating need for transport (in terms of space and time); difficult conditions for a balanced provision of public transport

#### *Important national policy objectives Strategy for Sustainability (selection)*

- Reduction of land consumption for settlement and transport (from 129 ha/day in 2000 to 30 ha/day in 2020)
- Recycling of inner city waste land sites
- Decoupling economic growth from land consumption
- Promotion of inner city housing instead of suburban living
- Achievement of greater mobility while reducing traffic volumes and traffic impacts
- Reduction of traffic through urban development control
- Strengthening of mixed uses and traffic-saving land use patterns
- Concentration on development at transport nodes
- Exploitation of synergies through integrated planning
- Application of the “compact-city” concept
- Effective combination of infrastructures

### *Barriers arising from competing objectives and applied instruments*

1. Financial housing support such as home-owner benefits; Encouragement of urban sprawl. Demands for abolishment, regional differentiation or limitation to developed land
2. Tax-deductible commuting expenses for employed persons; Encouragement of longer commuting distances. Demands for abolishment
3. Grants for building land from local government;; Encouragement of building in non-integrated areas. Demands for using this as a control instrument

### *Important research programmes*

Federal Ministry of Research and Education (Long-term oriented research)

- Programme: Mobility and Transport
- Kagiv (trans-border cooperation Germany/Czech Republic on transport infrastructure and public transport)
- Intermobil (among other aspects: guidelines, models and tools for integrated land use planning, regional cooperation)
- Bahn.Ville (rail-oriented urban development as part of the German-French trans-national initiative "Deufrako")
- Programme: Building and Housing in the 21<sup>st</sup> Century (to be ceased)
- Ruhr Area 2030 (fields of regional cooperation between 9 cities)
- EVALO (planning principles for compact and mixed used neighbourhoods)
- Urban Periphery (basic research on dislocation of enterprises in conurbations – reasons and implications)

Federal Ministry of Transport, Building and Housing (mission-oriented research / political consulting)

- Programme: Experimental Housing and Urban Planning (ExWoSt)
- Land Recycling Management (development of strategies)
- City Districts in Transformation (concepts for adaptation of infrastructure)
- Urban Development and Urban Transport (urban development, public transport and mobility management)
- Programme: Urban Transport (FoPS)
- Transport in Shrinking Cities (Preservation of existing infrastructure in times of declining demand for public transport)
- Legislative regulation for Transport in regional development plans (Development of legal methods and instruments for development plans)

Also minor research activities at other Federal Ministries, Federal States and Foundations

Conclusion: A very good level of knowledge on integrated land use and transport is available in Germany, but there is a striking lack of implementation!

Recommendation: Focus on proactive-oriented research rather than on knowledge-oriented research

### *Exemplary approaches for integration of land use and transport in practice*

Neighbourhood level:

- Districts with restricted car-use (Bremen, Freiburg, Berlin, Munich)
- Districts applying the “compact city concept” (Tübingen)

City level:

- Urban restructuring (East Germany, Leipzig)

Regional level:

- Decentralised Concentration and strengthening of urban centres (Brandenburg)
- Regional cooperation and development control (Hanover Region, Stuttgart Region)

Conclusion:

- Many of these projects and initiatives have either not been successful or have not become accepted as exemplary models. Integration of land use and transport has not become common practice yet.

### *Main research questions*

1. How can fundamental knowledge on integrated land use and transport be put into action? (Implementation of processes at different spatial levels)
2. What are the main barriers for implementation and how can they be overcome?
3. How feasible are new instruments of development control for an approach of economic land use (such as trade with land use rights, compensatory measures for environmental protection, development charge)?
4. What are the effects of new instruments such as the above mentioned and others (e.g. road pricing) on land use development and transport (research on implications)?
5. How can the existing urban fabric be further improved in order to avoid new development?
6. What are further integrated and trans-disciplinary models that can be transferred and repeated easily?
7. What are suitable guidelines for an integrated land use and transport planning?
8. How can institutions responsible for implementation and important stakeholders be effectively integrated in processes (such as administration, politicians, associations, citizens, schools, enterprises, housing companies etc.)?
9. What are the real and future costs of infrastructure and public transport for new developments in both non-integrated and integrated locations? What are the external costs? How can they be taken into account in the future?

General recommendation: stronger integration of future needs and trends instead of status quo orientation

*Suitable elements for supranational / international cooperation*

Precondition for cooperation: clear benefit for all partners compulsory

Scope of cooperation: due to different trends, needs and legal frameworks fields of cooperation limited

Possible fields of cooperation:

- Trans-national: Trans-border Urban Development and Regional Cooperation
- EU-level cooperation: Development and testing of tools to be applied in the frame of the EU as a whole (financial, legal)

**Discussion**

*Joint and additional research elements*

After the introducing presentation the participants were asked to write down interested research elements for their own country 1) similar and 2) additional to the suggested research elements. After having made the inventory of all new research elements questions for transparency and discussion on relevancy for ERA-NET TRANSPORT started up. Finally each attending country was asked to make their (limited number of) priorities in the overall list. The next table presents the results of the joined and additional research elements and the priorities given to it by the countries.

<b>Interest in cooperation on suggested elements by Germany</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Implementation research	D	NL
Multi actors, integration in process	F	NL, D, F
Multi actor decision making	NL	-
Development and testing of tools at EU level (land use rights, environmental measures, development charge)	D	D
Real and future costs of public transport and infrastructure	D	F, D, Uk
Trans-border urban development and cooperation	D	-
Effects of road pricing	UK	UK

<b>Interest in cooperation on additional items</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Integrated multimodal transport interchanges	UK	NL, UK, F
Implementation of R&D results	D	-

*Clarification and explanation for subject where necessary*

Netherlands

Multi actor decision-making: Decision-making takes a lot of time, so we have to be very careful in this process. We need all stakeholders are on board.

France

Multi actors, integration in process: see above. Involve knowledge institutes at an early stage

Germany

Development and testing of tools at EU level (land use rights, environmental measures, development charge): a comparison of different tools is needed, for example in Germany: a tree for a tree. What are other experiences with for example compulsory balancing charges?

Implementation of R&D results: How do we implement? Multi actor approach can also be helpful in this process. For example: urban development cooperation. The subject is not new but which factors can facilitate this process??

**Discussion points**

- All participants agreed on the importance of Multi Actor Decision Making. Due to cultural differences between countries and sometimes even within countries, the methodology and possibilities of multi actor decision making may differ from region to region. Still it is important to develop knowledge about this important method.

**Prioritised research elements**

- |  |
|--|
| <ol style="list-style-type: none"><li>1. Multi actor decision making</li><li>2. Integrated Multimodal Transport interchanges</li><li>3. Real and future costs of public transport and infrastructure</li></ol> |
|--|



## 7. Pricing and taxation (parallel session)

### Participants

Thilo Petri (D), Pascal Bain (F), Kjell Werner Johanssen (N), Erik Amdal (N), Petra Delsing (NL), Gerard Offerman (NL), Jeroen van den Berg (NL), Ad van Ommen (NL), John Collins (UK), Henk van Zuylen (NL/Chair), Daniëlle de Bruin (NL/Notes)

### Definition

Specifying the charges imposed for access to and use of elements of the transport system.

- It includes fares, parking charges, road user charges and tolls.

Taxes are either related to the right of access or to the use of the infrastructure, or are a simple and practical instrument for raising state revenues.

- Pricing and taxation can be an important means of influencing the demand for travel for each mode of transport.

### Introducing presentation by Norway (by Kjell Werner Johanssen)

#### *Important trends in Norway*

- General trends affecting the transport sector:
- Globalisation of trade increase trade and transport
- Outsourcing of production
- Integration of logistic chains
- Increased focus on environmental issues
- Shift from domestic production of products to services
- Workforce shifting from primary industries to service sector
- Centralization both national (to the largest cities) and regional (to regional centres)
- Passenger transport more important for the economy (service sector, tourist industry) both domestic and internationally
- Reliability and punctuality more important also in freight transport
- Rapid growth in freight transport on the road
- Need for better QUALITY in transport infrastructure and services

#### *Pricing and taxation in transport*

- Fees to self finance services, cost coverage (airport fees, port fees, pilot dues)
- Marginal cost pricing (in theory for railway infrastructure- in practice for freight only)
- Tolls on trunk roads to co-finance with public funds
- Toll rings in 7 urban areas to co-finance broader packages - "Dutch treats"
  - both road improvements and 0-30% for public transport
- Total toll revenue / road investment increased from 4-5% in 1986 to 35% in 2002

- Most tolls based on common electronic collection system (from 2004 “Autopass”)
- Legislation open to “road pricing” in urban areas – will it be introduced????
- Subsidies on local public transport, regional air and rail transport (=> tendering)
- Fuel taxes: both environmental (Co2) and revenue motivated
- Annual car tax
- Purchase and registration taxes on vehicles based on weight and engine size
- Company cars, user benefits are taxed as income

### *Important policy objectives*

National Transport Plan 2006-2015, main objectives:

- Fewer killed and severe injured in road traffic – keep safety standard in other modes
- More environmentally friendly urban transport – reduced dependence on private car, increased use of public transport
- Improved accessibility in and between regions – to achieve development and growth for jobs and living in regions and – the needs for trade and commerce
- A more effective transport system – more competition for better overall utilisation of resources in the transport

Pricing and taxation NTP 2006-2015, objectives:

- Balance benefits and both internal and external costs
- Finance internal costs – cost coverage (full or parts)
- Ports, airports
- Tolls; Trunk roads, urban “packages
- Tolls; emphasize accordance benefit – fee
- Tolls; reduced collection cost with fully automated systems
- Tolls; collection over maximum 15 years
- Marginal cost pricing with respect to external costs (both tax and subsidy)
- Finance public expenditure in general
- Choice of financing instrument
- Fair competition and coherence with taxation of different modes
- general strategy to achieve different objectives in transport sector

### *Important research programmes*

Research Council of Norway:

- RISIT Risk and Safety in the transport sector-
- Environment and Health transport a minor part
- Pollution: Sources, Dispersion, Effect an Measures transport a minor part
- PULS (Service, Commerce and Logistics) innovation programme: Focuses on value creation in service oriented enterprises through networking and collaboration.
- RENERGI Energy production and transmission stationary and mobile use, Hydrogen and zero emission in transport

Ministry of Transport:

- POT (Program for Supervisory Transport Research???)
- Themes 2005-2008: Freight, Strategic planning, Deregulation, Competition, Financing, ICT/ITS, infrastructure investment/operation/maintenance

EU 6.FwP railway, traffic safety.

EU 7.FwP ?

### *Main research questions*

General transport related:

- Safety across transport modes
- Security, transport of hazardous goods
- Environment
- New technology, Hydrogen in transport is a focused area
- Innovation in the service sector
- Intelligent Transport Systems
- Pricing and taxation related:
- Balance Price and Tax measures
- Marginal cost pricing (taking external effects into account)
- Cost Coverage
- General taxation purposes, cost of finance compared to other tax measures

With (transport policy) objectives with rpt:

- Overall Efficiency, competition, "Fair and efficient prices", cost of finance
- Budget constraints
- Equity, acceptability

### *Suitable elements for supranational / international co-operation*

Examples related to prices and taxation:

- The threefold role of prices and taxation in transport;
- "Getting the prices right" - marginal cost pricing
- "Getting the supply right" - Cost coverage
- "Getting the proper revenue" – General tax purpose – Ramsey pricing
- Pricing and taxation of international air and maritime transport? (in practice zero wrt Kyoto)
- Organisational structure / market organisation for rail and maritime transport to compete with road transport
- Harmonisation of ITS standards
- Harmonisation of national charges on road use?

## **Discussion**

### *Joint and additional research elements*

After the introducing presentation the participants were asked to write down interested research elements for their own country 1) similar and 2) additional to

the suggested research elements. After having made the inventory of all new research elements questions for transparency and discussion on relevancy for ERA-NET TRANSPORT started up. Finally each attending country was asked to make their (limited number of) priorities in the overall list. The next table presents the results of the joined and additional research elements and the priorities given to it by the countries.

<b>Interest in co-operation on suggested elements by Norway</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Harmonisation of National charges of road use	NL	F
Harmonisation of ITS Standards	D	-
Harmonisation of technologies (ITS) for road pricing	F	F, D, NL
Marginal cost pricing	UK	-
The threefold role of 1) getting.. MC pricing, 2) getting the supply ... cost coverage, and 3) getting the proper .. General tax purpose	N	-
The Threefold role (see above)	NL	N, NL, UK
Coherence MCP, Cost coverage and revenues	N	-
Equity and acceptability of road pricing	F	-
Equity and acceptability (redistribution effects)	UK	UK, D, F
Acceptance of road pricing	NL	N
Relation to congestion on roads	NL	-

<b>Interests in co-operation on additional items</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Harmonisation of fuel taxes	F	-
Harmonisation of freight taxation	F	-
Organisational structure	NL	-
Use of tolling vs public funds	N	N
Infrastructure for road pricing	UK	-
Research on standard international technology regarding road pricing: 1 standard for EU	NL	-
Marginal cost pricing, a sound basis for PPS?	NL	-
Acceptability	NL	-
Research on the effects on transport (congestion, modal shift), of different forms of toll / road pricing etc	NL	D, NL
World wide / European comparisons - culture - technics - politics - policies	NL	UK

*Clarification and explanation for subject where necessary*

Netherlands

- Worldwide / European comparisons for culture, technics, politics, policies. Not only comparison but also learning
- Organisational structure: How much grip does the government want to have?

France

- Harmonisation of technologies (ITS) for road pricing: Research on standard regarding, road pricing: one standard for EU, (esp. for freight)

#### **Discussion points**

- With respect to pricing several uncertainties and areas of research exist. Harmonisation is seen as important, but it is unclear what the costs and the benefits will be. Also the best way to get acceptance of this kind of measures has to be investigated. The impact of pricing on different groups of travellers still has to be clarified.
- It is likely that pricing will have an influence on modal choice, departure time choice and other travel decisions. These decisions must have an impact on congestion, but how much the impact will be and how sustainable in the long term, is still a question for research.

#### **Prioritised research elements**

1. Coherence between marginal cost pricing, cost coverage and revenues
2. Harmonisation of ITS standards (esp. freight)
3. Equity and acceptability of road pricing

## 8. Regulation and deregulation (parallel session)

### Participants

Tobias Thomea (D), Pascal Bain (FR), Kjell Rosanoff (N), Richard Savenije (NL), Mario Fruianu (NL), Sieds Halbesma (NL), Ad van Ommen (NL), John Collins (UK), Pieter-Jan Bouwmeister (NL/Chair), Jos Koene (NL/notes).

### Definition

Regulation is the use of physical regulation or the law to correct (market) failure in the transport sector.

It may be used to achieve specific transport objectives, such as safety.

Deregulation is the removal of regulations, often in order to adjust competition policy. Deregulation does not always mean privatisation. If (government) regulations are perceived to be failing in some way, deregulation is often called for.

### Introducing presentation by France (Pascal Bain)

*Mega-trends in France (identified by the transport panel of Agora 2020)*

- Difficulties to develop new infrastructures and to fund public transports, due to financial constraints (34)
- Growing role of the European regulation for transport and the environment (32)
- Growing role of regulation and toll tools for traffic control by local authorities; toll, interdiction of cars in city centres, etc. (23)
- Growing exigencies for security and generalisation of speed limitations; demand for regulation (20)
- Extension of the NIMBY syndrome and of the local conflicts due to the localisation of new infrastructures (18)
- Complexification of the institutional actors system for the organization of transports and emergence of conflicts of scale between cities, regions, states, etc. (8)
- Growing role of the private sector for infrastructures and transport systems funding (8)

### Uncertainties and opportunities

- Future of the public services of transport in the context of deregulation
- Funding of the European infrastructure networks?
- Opportunities for a strong harmonisation of national transport policies?
- Creation of European transport regulation agencies?
- Creation of local institutions/agencies integrating efficiently urban policies and transport policies?
- Generalisation of the interdiction of cars in city centres?
- Generalisation of tolls for inter-urban transport of goods

## Issues and key-questions

- Impacts of green-house effects gases
- Oil dependency and vulnerability of the transport system
- Impact of China and India as great economical powers
- Impact of the reorganisation of « the world-factory »
- Impact of the ageing society
- Massive adoption of cars in emerging countries
- Funding of public transports by local authorities
- Saturation and congestion due to the polarization of space and metropolisation
- Impact of health concerns
- Relations between city centres and peripheries and accessibility to centres
- Funding for the creation and maintenance of transport infrastructures
- Place of ICT in transports and development of “intelligent transports”
- Social acceptability of innovations
- Consumer/citizen schizophrenia for the vehicles choices.
- Capacity of Europe to regulate efficiently the European area of transports
- Role of the environment preservation for the choices of mobility modes
- Impact of the insecurity feelings on the transport demand
- Weak efficiency of the public decisions
- Role of participative democracy
- Competition between modes (air, sea,...) for the transport of goods
- Future of the railway in France after the opening of the market
- Evolution of mentalities with respect to speed
- Role of transport for the competitiveness and attractiveness of territories
- Accompanying measures of an “authoritarian” management of urban mobility
- Tools (financial, regulation,...) to accelerate the renewal of the fleet

## Important policy objectives

Evolution from a national State “operator of services” to a State “regulator” (including the definition of a strategy)

- organisation of a seminar on “The regulator State and the evolution of public policies”, organised by the ministry of Public Works, Transports,... in order to survey recent evolutions of the role of the State, identify good practices and make recommendations for the future of the ministry. A meeting was on the regulation and monitoring of rail transports.

Specific policy objectives for transports (“Loi sur les schémas collectifs de transport – 2001”)

- Making optimal use of existing infrastructure and developing intermodality,
- Reducing noise and air pollution and notably their effect on the environment,
- Encouraging the use of more environment-friendly modes by providing appropriate information and pricing strategies,
- Improving safety in transport, in particular road safety.

Some major issues: multimodal information, freight management, payment means and law enforcement.

### *Harmonisation of the Procedures throughout EU*

- harmonisation of the procedures to access to the networks, (specially railway networks, with the procedure of path allocation)
- harmonisation of the procedures for the maritime transport (on security and safety, traffic rules, controls,...)

But also, in order to avoid distortions on competition

- harmonisation of dispositions related to the social rules (in particular related to the professions in the freight sector)
- harmonisation of taxations (in particular on fuel)

### *New regulatory measures for privatisation of infrastructures - regulation standards*

- a already long tradition exists in France with the concession of motorways.
- growing role of the PPP (public/private partnerships) to fund new transport infrastructures projects (a recent example : the Millau bridge)
- railway infrastructures should stay the property of RFF (*réseau ferré de France*)

But, also

- creation of a national funding agency to fund infrastructures (AFITF) - 26 November 2004 – 75% of the budget for investment in rail, fluvial and maritime transports

### *Air quality: Consistent regulations for all vehicles, based on sound techno state of the art*

- The “clean vehicles” plan – 2003
- “Plan climat” - 2004 (mainly on the reduction of CO2 emissions)
- Action on the vehicles : motorisation and cooling system
- Action for the bio-fuels
- Action on the driver’s behaviour: speed and “eco-driving”
- Action on the buyer of a new car : information on the cars consumption and a “bonus-malus” system
- Action to improve the urban public transport efficiency
- Action to improve the intermodality of inter-urban transports for passengers and for freight

### *Simplification and reduction of traffic signs and rules*

- For railway
- Role of PREDIT/DEUFRAKO on the standardisation and definition of norms for control/command and signalling systems for rail
- Creation of the ERTMS (European Rail Traffic Management System)
- For road transport
- contribution to the definitions of norms for the harmonisation of road signalisation (conventions of Vienna)

### *Interoperability of rail: Systems allowing competition*

- Separation of activities: in France, the railway services operator (SNCF) and the infrastructure operator (RFF) are separate entities since 1997
- Regionalisation: regions can become railway transport “organising authorities” since and make open calls to choose their services operator.
- Transposition of the European directives 2001-12, 2001-13, 2001-14 (first railway package) in a “Decret” (n° 2003-194 du 7 mars 2003) + several “Arrêtés”: requirements to access to the French network:
- Having a license as a railway company
- Getting a safety certificate
- Obtaining a path allocation including both the definition and the assessment of availability and the allocation of individual train paths

### *Important research programmes*

None today (PREDIT 2002-2006), except:

- A research project on the “economic evaluation of investment projects”

But in the previous PREDIT rounds:

- on the air regulation in Europe : evolutions of environmental regulations of the air at the horizon 2015 (Stéphane Callens)
- transport, energy and environmental constraints in 2030, a back-casting approach (Bertrand Chateau)
- railway tolls in Europe and rights of access : two options for regulation (Manuel Baritaud)
- evaluation of the efficiency on local transport policies (PDU) (Bernard Jouve, Jean-Marc Offner)
- social regulations to improve transport public services (Pierre Massie)
- legislation and work relations in the freight sector (Stéphane Carré)

### *Important research questions*

Funding and new regulatory measures

- Comparison of different funding scenarios of public transport at the horizon 2030. Role of public/private partnerships in the funding of future investments
- Evaluation of the investment and exploitation costs of the transports infrastructures and public services (long term sustainability).
- Understanding of the impact of social redistributive policies on the transport demand.
- Comparative analysis of the funding systems of different public services: transport, education, health, culture (evolution, funding structures, incentives, impacts, regulations)
- Analysis of toll innovations that can be transferable to France.
- Analysis of the difficulties (like the LKW in Germany) and success stories (RPLP in Switzerland) for the pricing of infrastructures

#### Regulation, liberalisation and strategy of actors

- Strategies for the national (railway) services operators in European. Prospects for alliances. Restructuration of the railway companies.

#### Pollution

- Extension of French and European regulations to « new pollutants » (not yet regulated) like the ones produced by road and pneumatics wearing

#### Regulation and renewal of the fleet

- Identification of means to modify the consumer behaviours and help the penetration of “clean cars”.
- Ways to accelerate the obsolescence of the current fleet at adequate social conditions.
- Evaluation of the impact on energy of the different strategies (depending on the technological orientations) of fleet renewal.

#### Other questions

- Study of the making of European transport policies: roles of the Commission, of the Parliament, of the member States, of lobbies, etc..
- Strategies of the national institutions to become the actors of the European processes.
- Bureaucratic or democratic regulation? Role of the participative democracy.

### Discussion

#### *Joint and additional research elements*

After the introducing presentation the participants were asked to write down interested research elements for their own country 1) similar and 2) additional to the suggested research elements. After having made the inventory of all new research elements questions for transparency and discussion on relevancy for ERA-NET TRANSPORT started up. Finally each attending country was asked to make their (limited number of) priorities in the overall list. The next table presents the results of the joined and additional research elements and the priorities given to it by the countries.

<b>Interest in co-operation on suggested elements by France</b>	<b>Introduced by country</b>	<b>Prioritised by county in second round</b>
(Funding) understanding impact social redistributive policies transport demand	UK	
Analyses toll innovations	UK	UK
Role of PPP Particular in relation to transfer of risk	UK	UK
Comparison of different scenarios of PPPP at the horizon 2030	NL	NL, F
Comparative analyses of funding systems of different PPP structures	NL	NL, N
Funding of liberalised Public Transport	N	
Regulation, liberalisation, strategy of actors (Rail)	N	F
Pollution	F	

<b>Interest in co-operation on suggested elements by France</b>	<b>Introduced by country</b>	<b>Prioritised by county in second round</b>
Regulation and renewal of the fleet help penetrate clean cars	UK, N	UK, N

<b>Interests in co-operation on additional items</b>	<b>Introduced by country</b>	<b>Prioritised by county in second round</b>
Regulatory measures for privatisation of infrastructure		

### *Discussion points*

- Related to regulation the strategy of actors (rail) in the liberalisation process is important. An Interesting element is the renewal of the fleet (perhaps even together with possibilities for penetration of clean cars).
- The possibilities for public funding (PPP) in a liberalised Public Transport.
- The identification of relevant regulatory measures for privatisation of infrastructure.
- In case of PPP- constructions (more) research is necessary for understanding how it operates. What seems to be needed is some kind of trans-national horizon on PPP-constructions. The main problem with PPP-constructions is that governments operate nationally and companies operate internationally.

### **Prioritised research elements**

- |   |
|---|
| <ol style="list-style-type: none"> <li>1. Funding and new regulatory measures (Comparison of different scenarios of public transport at the horizon of 2030)</li> <li>2. Regulation and renewal of the fleet (Incl. pollution aspects)</li> <li>3. Regulation, liberalisation and strategy of actors</li> </ol> |
|---|

## 9. Transport and infrastructure management (parallel session)

### Participants

Tobias Tomae (D), Sylvie Niessen (F), Richard Savenije (NL), Ad van Ommen (NL), Mario Fruianu (NL), Anna Klaczka (P), Matthew White (UK), Henk van Zuylen (NL/Chair), Daniëlle de Bruin (NL/Notes)

### Definition

Measures to change the way in which the existing transport system is used. Approaches include

- increases and reductions in road capacity reallocations of capacity
- changes in the operation of public transport.

They include measures to influence car, public transport, cycle and freight vehicle use and the use of unmotorised modes.

### Introducing presentation by The Netherlands (by Richard Savenije)

#### *Important trends in The Netherlands*

- More private en society initiatives: less government
- More responsibility by citizens and society actors
- Quick changing demand for tailor made products and services
- Bigger role market sector (PPS)
- Tension between individual wishes (e.g. accessibility) and society mutual needs (safety, security, durability)
- Regional cooperation (authorities and private sector)
- Network management
- Effectively, monitoring, output
- Reliability

#### *Important policy objectives*

- Facilitation of Mobility growth (passengers and goods)
- More coherence transport, economic development and spatial planning
- Tackling (road) congestion
- Traffic: reliable and quick
- Decentralisation and regional cooperation
- Network management (parking, bike, public transport)

#### *Important research programmes*

##### National

- Roads to the Future: Short term new products
- Trail: University programme, e.g. models, techniques

- Transumo: public and private sector cooperation - Better Mobility for 2010 and later
- Incident Management

#### International

- Framework Program European Commission (roads, waterways, research, transport, information)
- Centrico, Viking, Certi (cooperation road authorities)
- Memory of Understanding (Certu, Setra, Ectri)

#### Main research questions

- how do we create effective partnerships
- from a supply to a demand mobility market
- financing of transport systems and infrastructure
- pricing systems, financing of road and public transport
- reliability, safety and security of transport systems
- car- and information technology: consequences for road administrators
- implementation of innovation, together with industrial partners
- Information: which types of information are needed
- how do we reach sustainable mobility (green gas, climate changes, safety and security)

#### *Suitable elements for supranational / international co-operation*

##### Innovation

- Technology
- Information
- Traffic Management
- Financing & Pricing

##### Cooperation

- (Regional) Governments
- Private Partners, Industry
- Road Authorities
- Network Management

## **Discussion**

### *Joint and additional research elements*

After the introducing presentation the participants were asked to write down interested research elements for their own country 1) similar and 2) additional to the suggested research elements. After having made the inventory of all new research elements questions for transparency and discussion on relevancy for ERA-NET TRANSPORT started up. Finally each attending country was asked to make their (limited number of) priorities in the overall list. The next table presents the results of the joined and additional research elements and the priorities given to it by the countries.

<b>Interest in co-operation on suggested elements by The Netherlands and the Delphi results</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Integrated transport centres	F	NL
Tourism	F	F
Quality criteria	F	-
Traffic management, safety goals versus accessibility goals	NL	-
From a supply to a demand mobility market “door to door”	NL	F, NL
How do we reach Sustainable Mobility?	NL	-
Traffic Management systems especially cross border TMS	D	D

<b>Interests in co-operation on additional items</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Accessibility (less able to move around) for both disabled and ageing people	F	-
Buying and sharing (traffic) information with private partners	NL	UK, NL
Reliable Urban accessibility, door to door multimodal urban access	NL	UK
Improve quality transport system, user oriented system (each mode its strength)	NL	-
How to get a user friendly attitude (user orientation) in public railway companies? (Social science)	NL	-
GPS and Galileo for all transport modes	D	UK, D
Advanced, IT supported international logistics	D	F, D

*Clarification and explanation for subject where necessary*

Germany

- Traffic Management systems especially cross border TMS: In Germany Traffic Management works bottom up: first let regions co-operate. Internationally it should also be this way: so first look for co-operation between boarding regions, before starting co-operation between countries as a whole.
- Advanced, IT supported international logistics: There are many electronic devices for logistics (tracking and tracing). TMS can be used to reduce the transportation time of all kinds of freight.
- GPS and Galileo for all transport modes: We have to prepare for potential advantages of Galileo. It is better for both individual countries as EU wide. If well prepared, Galileo can serve several goals (safety, efficiency) at the same time

France

- Integrated transport centres: comparable to hubs. Integrate different functions in these centres, in order to create new finance opportunities for transport. In France the regions have to reorganise in order to get the money they need.

- Quality criteria: France would like to get some ideas from other participants on quality criteria for public transport
- Tourism: Tourist traffic is growing and becomes more important. How can we quantify it? We need research capacity. Specialists in tourism and specialists in transport need to learn to understand each other.

#### Netherlands

- Improve quality transport system, user oriented system (each mode its strength): Behavioural aspects are important. We need to KNOW the customer. There are no best practices or examples at a national level.
- How do we reach Sustainable Mobility? There is need for examples: How do other countries improve their SYSTEM in a sustainable way? NL is focussed on land use planning, but what are the experiences with for example ICT?
- How to get a user-friendly attitude (user orientation) in public railway companies? (Social science): Motivation is very important in order to improve the system. We need the social science within the companies.

#### *Discussion points*

Also in other countries (e.g. the UK) the sharing of traffic data is an issue. Some participants asked whether the (regional) transport could be made more efficient if Integrated Transport Centres would be introduced, as a kind of hub. These centres could become important economic focus points. Other discussion subjects were:

- How do safety goals and accessibility goals interact? (is there a conflict?)
- How can social science help to improve the transport system (attitude of railway company employees)
- Accessibility for both disabled and ageing people
- What is the role of tourism in the transport sector?

#### **Prioritised research elements**

1. Buying and sharing (traffic) information with private partners.
2. From supply to demand mobility market ("door to door").
3. Advanced, IT supported international logistics.
4. GPS and Galileo for all transport modes.

## 10. Vehicle technology (parallel session)

### Participants

Andreas Dorda (A), Ernst Pucher (A), Tobias Thomae (D), Pascal Bain (F), Sylvie Niessen (F), Kjell Rosanoff (N), Mario Fruianu (NL), Ad van Ommen (NL), Richard Savenije (NL), Sieds Halbesma (NL), John Collins (UK), Pieter-Jan Bouwmeister (NL/Chair), Jos Koene (NL/Notes)

### Definition

All technologies related to vehicles of all modes, targeted to the sustainable policy objectives within transport.

- Analytical, experimental and conceptual work
- Hardware development for research purposes.

This theme does not cover base technologies and component technologies

### Introducing presentation by Austria (Andreas Dorda)

#### *Important trends in Austria*

1. Technological trends
2. Environmental trends
3. Economical trends
4. Political trends
5. Spatial trends
6. Social/cultural trends
7. Demographical trends
8. Other trends

#### *Important policy objectives*

Technology policy goals:

- Strengthen competitiveness of Austria's economy
- Support sustainable socio-economic development
- Improve quality of business location and secure employment

Transport policy goals:

- Increase efficiency of transport system
- Improve intermodality between transport modes
- Increase sustainability, safety and security in transport

### *Important research programmes*

#### IVS2 Intelligent transport systems and services

- I2 Intelligent infrastructure
- Technology Policy Goals:
  - Strengthen competitiveness of Austria's economy
  - Support sustainable socio-economic development
  - Improve quality of business location and secure employment
- Transport Policy Goals:
  - Increase efficiency of transport system
  - Improve intermodality between transport modes
  - Increase sustainability, safety and security in transport
- ISB Innovative system railway
- A3 Austrian Advanced Automotive Technology
- Secure competitiveness of an Austrian key industry (8,7 Bill. Euro, 35.000 employees)
- Strategy for technological breakthroughs (e.g. alternative propulsion systems, new materials and fuels, drive by wire, vehicle electronics)
- Concentration on problems of public concern not solved by market forces alone
- Thematic areas: new propulsion systems, energy efficient auxiliary units, alternative fuels, new vehicle concepts, intelligent vehicles, low noise vehicles
- (Austrian Hydrogen and Fuel Cell Initiative / AHFI)

### *SWOT analyses general*

<b>Strengths</b>	<b>Weakness</b>
Individually outstanding scientific	Largely limited networking
Personnel / background	Awareness of other activities
Solid technology base	Partially exotic technology approaches
Mid size company response speed	Mid size resource structure
Successful instruments for technology	
Policy Competence Centres (ACC, etc.)	

<b>Opportunities</b>	<b>Threats</b>
New solutions with very limited competition may be turned into a whole new industry	Too many, too little, too late
Risk of substitution may be controllable	Cost structure for mass manufacturing

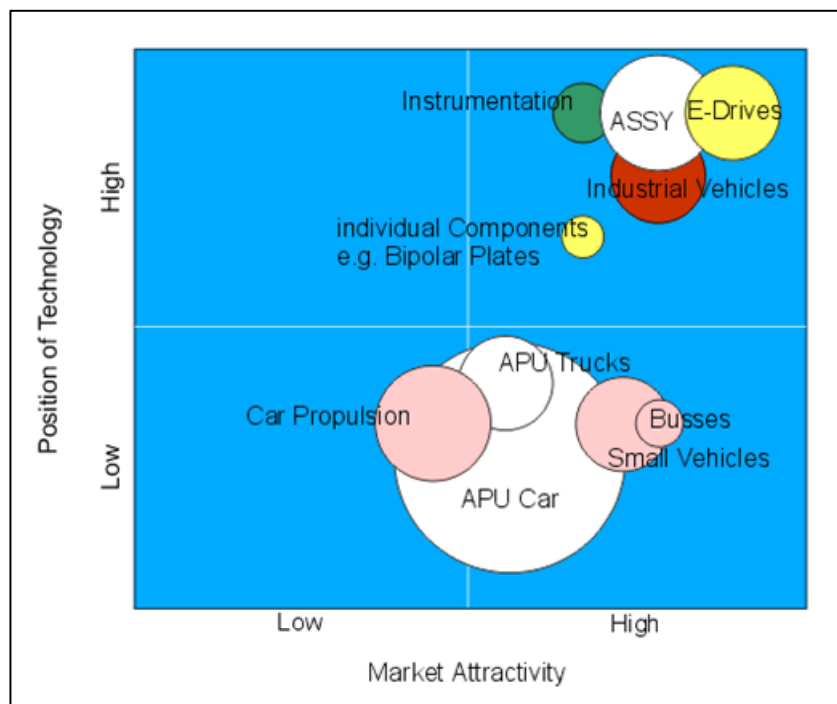
*SWOT analyses technology segment*

<b>Strengths</b>	<b>Weakness</b>
FC's with circulating Elektrolyt	PEM Membrane Technology
Material technology (Elektrodes, Interconnectors, Bipolar Plates)	(Exception FumaTech (D) als bwt subsidiary)
Elektric Drives	Fuel reformers for standard fuels
Fuel storage technology	Low R&D activity in the high
Sensors / Instrumentation	temperature sector
Simulation	
Vehicle application and manufacturing in small to mid quantities	

<b>Opportunities</b>	<b>Threats</b>
Establishing a Component Industrie for a Bln. EURO Market	Markt Timing
	IPR in mature Technologies

*First Portfolio Analysis*

H. Wancura: "Brennstoffzelle für mobile Anwendungen - Österreichische F&E Aktivitäten und Strategieoptionen für die Zukunft" erstellt im Auftrag des bmvit durch INTEMA Consult GmbH, Graz



Strategy options

- Reserve-the-right-to-play“: Minimal investment, mainly observation
- Hedging“: Only technologies will receive funds which will be successful independent of the success of the fuel cell
- Focus“: Pushing of selected specific technology / component sectors
- Leadership“: Establish leadership by consistent use of synergies and comparatively high levels of investment, while scales are still relatively low.

Main research questions (A3 focus)

- Propulsion systems (Otto, Diesel, EV, Fuel cells, hybrids)
- Pollution and Particulate Reduction
- Noise Abatement Measures
- Alternative fuels
- Innovative vehicle concepts and light weight materials
- Energy efficient vehicle air-conditioning and auxiliary units
- Vehicle electronics and communication systems

Main research questions (Austrian Hydrogen and fuel cell initiative)

Vision for the AHFI focusing on 3 important objectives:

- Development of a high efficient electric power train as important element of an efficient overall system
- Propulsion systems using hydrogen from renewable sources
- Development of a fuel cell as auxiliary power unit

Main research questions (ISB focus)

Suitable elements for supranational / international co-operation

Topics´ Matrix		Track System (incl. Stations)	Vehicles & Traction	Soft- & Org- Ware, Process
Interoperability	Standardised technical and operational solutions			
Safety & Security	Safety of railway lines			
	Safety of railway tunnels			
	Safety of vehicles (passive & active) Personal security / human factor			
Environment	Noise performance			
	Emissions			
	Energy consumption Environmental sustainability of materials			
"Rail System"	Intelligent Mobility			
	Innovative Materials & Production Methods			
	Intermodality Innovative rail transport systems			

**Project proposals to be classified to a module**

- Interdisciplinary co-operation with at least 3 partners in the projects.
- Funding instruments ranging from studies, basic research, applied research to demonstration and pilot projects.
- Education and training projects in fuel cell technologies, mobility of researchers (funding of thesis at a foreign research institute, international R&D-co-operation with foreign partners in the projects).
- Niches for a small country like Austria and includes for this reason also R&D activities beyond the actual main stream

## Discussion

### *Joint and additional research elements*

After the introducing presentation the participants were asked to write down interested research elements for their own country 1) similar and 2) additional to the suggested research elements. After having made the inventory of all new research elements questions for transparency and discussion on relevancy for ERA-NET TRANSPORT started up. Finally each attending country was asked to make their (limited number of) priorities in the overall list. The next table presents the results of the joined and additional research elements and the priorities given to it by the countries.

<b>Interest in co-operation on suggested elements by Austria</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Alternative fuel (excluding Fuel cells)	F	A
Pollution & particulate reduction	N	
-Air Quality legislation	NL	
Pollution & particulate	UK	F, UK, NL, A, N, D
Techniques to reduce noise & Emission	D	
Noise Abatement	UK	
Vehicle Electronics/Communication systems	UK	D, NL, F, UK
Pollution systems	N	
Energy in Motion	NL	N, A, NL
Propulsion systems	UK	
Alternative efficient Drive trains especially hybrids	D	

<b>Interest in co-operation on suggested elements by Austria</b>	<b>Introduced by country</b>	<b>Prioritised by country in second round</b>
Pollution & Particulate matter impacts	F	
Protection of consumers: Safer vehicles to protect pedestrians	UK	
Vulnerable users <ul style="list-style-type: none"> <li>- pedestrian protection</li> <li>- motorbikes</li> </ul>	F	UK, A, F, N

### *Discussion points*

- What is the role and position of governments related to roll and position of industry e.g. in the area of propulsion research. The topics that came forward were:
- Vehicle technology is especially an industrial matter, which makes supranational cooperation in the field of research rather difficult.
- Research is legislatively driven; even so with new propulsion techniques.
- Important is research funding and not inventing new propulsion itself.
- Propulsion systems: Legislation/regulation makes it difficult for industry to develop new types of vehicles. The question is: "Who is responsible for driving systems?" In trying to answer that question a chicken and egg discussion follows. In the matter of alternative fuels the question raised: "How about future logistics? For instance (the exploitation of) fuel and refuel possibilities.
- A discussion followed about the balance between research and policy. EU and/or supranational Technology platforms will be very important. Beside the subject, the organisational and policy framework are (not to be) overlooked. There have to be dealt with international standards (Europe) or everyone is in trouble (user, industry and government). Helping one another is equal to helping ourselves. We are obliged to harmonise (trans-) national transport research programmes.

### **Prioritised research themes**

1. Techniques to reduce noise and emissions
2. Protection of pedestrians
3. Safety through driver assistance systems (ICT)
4. Propulsion systems (Energy in motion)

## 11. Plenary discussion and conclusions

### Overview of selected research elements

The chairmen of the parallel sessions of day 1 and the first hour of day 2, Pieter Jan Bouwmeister and Henk van Zuylen, gave presentations on the discussion and results of the parallel sessions. The overall list of selected research elements of all discussed themes are presented in the next table.

Research theme	Prioritised research elements			
<i>Land use planning and transport</i>	Multi actor-decision making process	Integrated Multimodal Transport interchanges	Real and future costs of public transport and infrastructure	
<i>T&amp;I Management</i>	Buying and sharing (traffic) information with private partners	From supply to demand mobility market ("door to door")	Advanced, IT supported international logistics	GPS and Galileo for all transport modes
<i>Infrastructure Provision</i>	Use of information in real time	Minimising impacts on environment and people	Value for money / long life infrastructure.	
<i>Decision support tools</i>	Establishing Environmental Values	Research of Reliability (esp. travel time)	Good Practice in Modelling (Urban/Interurban)	Time of Day choice
<i>Regulation/deregulation</i>	Funding and new regulatory measures	Regulation and renewal of the fleet (Incl. pollution aspects)	Regulation, liberalisation and strategy of actors	
<i>Vehicle Technology</i>	Techniques to reduce noise and emissions.	Protection of pedestrians	Safety through driver assistance systems (ICT)	Propulsion systems (Energy in Motion)
<i>Integration of Systems</i>	Mobility management	Multimodal Freight transport systems	Integration of transport management	Easy interchanges between modes
<i>Pricing and taxation</i>	Coherence between marginal cost pricing, cost coverage and revenues	Harmonisation of ITS standards (esp. freight)	Equity and acceptability of road pricing.	

### Discussion on selected elements

The chairman, Hans Jeekel, asked the participants for their reflection on the selected items and opportunities for integration.

The participants suggested that it was difficult to identify direct relations between the research elements, though:

- On the aspect of reliability both demand and supply aspects were identified
- Both rather obvious, non-conflicting research elements as well as, more difficult (to organise) research elements for trans-national co-operation were identified
- Especially the research elements regarding Security were missing; perhaps already nationally difficult to organise?

Furthermore it was brought forward that the main question should be: “What do we need to know?”, not “What is nice to know?”. Related to this condition it is of importance to get a right insight on the trade offs of the suggested research elements, and how to cope with it. Examples given are, societal effects, the breaking of monopolies, possible decreasing of operability of other (transport) systems through the introduction of new standards, the possible increasing inflexibility of sustainable (long-lasting) infrastructure and finally possible contra-productive effects of reduction measures in the automotive sector.

#### *Overall prioritisation*

The participants were asked to prioritise the selected research elements. Each country received a fictive amount of 10 million Euro, divided in 10 pieces of 1 million Euro. This budget could be allocated to research activities on the selected research elements. It was open for the countries themselves to make their choice of elements and the budget allocated to it. The next table gives the final result of the prioritisation in the total amount of research budget allocated per element (Meuro) and the number of countries that favoured the research element.

Research Area	Selected Research Element	Score (Meuro)	Nr. of countries
Integration of transport systems	Multimodal freight transport systems	7	5
Vehicle technology	Techniques to reduce noise	6	5
Infrastructure provision	Minimise impact on people and environment	5	5
T&I Management	GPS and Galileo for all transport modes	5	4
Decision support systems	Good practice in modelling	4	4
Decision support systems	Research on reliability	4	3
Pricing and taxation	Harmonisation of ITS standards	4	3
Pricing and taxation	Equity and acceptability	4	3
Integration of transport systems	Mobility management	4	3
Pricing and taxation	Coherence between marginal cost pricing, cost coverage and revenues	4	2
Infrastructure provision	Use of information in real time	3	3
Vehicle technology	Propulsion systems	3	1

T&I Management	Advanced IT supported international logistics	2	2
Decision support tools	Establish environmental values	2	2
Land use planning and transport	Integrated multimodal transport interchanges	2	2
Integration of transport systems	Integration of transport management	2	2
Vehicle technology	Safety through driver assistance systems	1	1
T&I management	Buying and sharing traffic information with private partners	1	1
T&I Management	From supply to demand	1	1
Infrastructure provision	Value for money/long life infrastructure	1	1
Regulation and deregulation	Funding and new regulatory measures	1	1
Regulation and deregulation	Regulations and renewal of fleet	1	1
Regulation and deregulation	Regulation liberalisation and strategy of actors	1	1
Land use planning and transport	Real and future costs of public transport and infrastructure	1	1
Integration of transport systems	Easy interchange between modes	1	1
Vehicle technology	Protection of pedestrians	0	0
Decision support systems	Time of day choice	0	0
Land use planning and transport	Multi actor decision making	0	0

#### *Discussion on prioritised elements*

There was no discussion. The chairman reflected to the top 10 of priorities in the research elements that the number of technical research elements is relatively high in relation to the number of societal based research elements, though both aspects are present.



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## Appendixes

## **App. 1. Agenda of the policy seminar**

### **Day 1, Thursday March 3<sup>rd</sup> 2005**

12.00 – 12.30	Welcome, aim of ENT and aim of the seminar ( <i>sandwiches available in the room</i> )
12.30 – 13.00	Results of WP1, WP2 and WP3 (and discussion)
13.00 – 13.30	Results of Delphi seminar and questions for identifying ENT themes (and discussion)
13.30 – 15.00	Discussion on themes for co-operation (in parallel groups)
15.00 – 15.30	<i>Break</i>
15.30 – 17.30	Discussion on themes for co-operation (in parallel groups)
17.30 – 17.45	End of day 1
20.00	<i>Joint dinner</i>

### **Day 2, Friday March 4<sup>th</sup> 2005**

09.00 – 09.05	Start of day 2
09.05 – 09.45	Discussion on themes for co-operation (in parallel groups)
09.45 – 10.40	Presentation conclusions and discussion in plenary meeting
10.40 – 11.00	Selection of most interested research elements
11.00 – 11.15	<i>Break</i>
11.15 - 12.15	Conclusions and discussion in plenary meeting
12.15 – 12.30	End of day 2 ( <i>sandwiches available in the room</i> )

## App. 2. Participants

Name	Organisation	Country	Present
Andreas Dorda	BMVIT	Austria	Yes
Ernst Pucher	Vienna University of Technology	Austria	Yes
Heimo Kropf	BMVIT	Austria	Yes
Martti Mäkelä	Ministry of Transport and Communications	Finland	Intended
Raimo Tapio	Road Administration	Finland	Intended
Matti Roine	Ministry of Transport and Communications	Finland	Intended
Sylvie Niessen	Ministry d'Equipement	France	Yes
Pascal Bain	Ministry d'Equipement	France	Yes
Tobias Thomae	BMBF	Germany	Yes
Thilo Petri	TÜV Akademie Rheinland	Germany	Yes
Kjell Rosanoff	Ministry of Transport and Communications	Norway	Yes
Kjell Werner Johansen	TOI	Norway	Yes
Erik Amdal	Public Roads Administration	Norway	Yes
Marek Sitarz	Technical University of Katowice	Poland	Yes
Anna Klaczka	Technical University of Katowice	Poland	Yes
Petra Delsing	Transport Research Centre	The Netherlands	Yes
Gerard Offermans	Ministry of Transport, Public Works & Water Management	The Netherlands	Yes
Mario Fruianu	Ministry of Transport, Public Works & Water Management	The Netherlands	Yes
John Collins	Department for Transport	United Kingdom	Yes
Matthew White	Department for Transport	United Kingdom	Yes
Hans Ingvarsson	Road Administration	Sweden	Intended
Claes Unge	VINNOVA	Sweden	Intended

### Organisation

Name	Organisation	Country
Hans Jeekel / chair	Transport Research Centre	The Netherlands
Sieds Halbesma	Transport Research Centre	The Netherlands
Ad van Ommen	Ministry of Transport, Public Works & Water Management	The Netherlands
Pieter-Jan Bouwmeister	Transport Research Centre	The Netherlands
Henk van Zuylen	Transport Research Centre/ Technical University of Delft	The Netherlands
Daniëlle de Bruin	Connekt	The Netherlands
Jos Koene	Transport Research Centre	The Netherlands

## App. 3. Finnish contribution: Information and Awareness

### Definition

Making information available to transport users and operators, to make them aware of the transport system's operation and thus to support transport policy.

- Fixed information systems
- Real time applications of ICT

The information helps travellers make more informed decisions about their trip.

From the transport policy point of view: measures to help support policy, to reduce car use.

### Introducing presentation by Finland

#### *Important trends in Finland*

##### General trends

- Aging population
- Measures to reduce greenhouse gas emissions
- "BRIC- phenomenon": growing investments into Brasilia, Russia, India and China --> material flows will turn
- USA is still important innovation leader
- Continuously faster technological development
- ICT has strong influence in procedures and activities
- Social innovations and human (user) needs important
- Climate change and extreme weather phenomenon
- Growing importance of security
- Centralisation of regional structure and dispersed community structure

##### Transport related trends

- Promotion of competitiveness by more efficient transport and logistics
- Continuously growing traffic in Finland
- Growing Russian transport and Russian role in taking care of it
- Baltic countries have become competitors for Finland in transit transport
- Growing Russian oil transport in the Baltic Sea, more strong traffic control in maritime transport
- Growing importance of airborne transport in freight transport
- Decreasing public transport (buss, train, airplanes)
- Rail traffic is opening to competition: freight in 2007 and passenger later on
- Pricing will be taken into use as financing- and management tool of transport first elsewhere and after a while also in Finland
- PPP coming more and more general, also other / alternative means of financing
- Changing procurement laws: call for tenders in expert services not obligatory (?)
- Technical specifications for interoperability
- Growing importance of competitiveness and productivity (also in public sector)

#### Operator related trends

- Changes in transport sector: Railway Safety Agency, Aviation Safety Agency, outsourcing of activities of Maritime and Road Administrations into state owned or private enterprises
- EU- presidency of Finland is near: development of logistics is coming as main emphasis area
- Large AINO-programme on real-time information systems has started
- Foundation of committee / working group for development of academic education and RTD in transport sector (Min.of Education, MoTC etc.)
- Growing demand for services covering whole transport chains (know-how of managing the whole system)
- Spare resources for R&D in public sector

#### ICT related trends

- ICT main sector of competitive economy
- Strong interest on ICT research and use in transport
- High penetration rate of use of Internet
- ICT accepted as one of the main driver of productivity development
- Digitised basic systems for transport introduced
- Development directed strongly towards content, real-time systems and services
- Mobile services development in main focus

#### *Important policy objectives*

From strategy paper "Towards intelligent and sustainable transport in 2025":

- Transport system service level and costs: safe, smooth, basic level guaranteed, transport info real-time and reliable, cost effective ...
- Safety and health: nobody needs to die, not detrimental to health...
- Social sustainability: benefits and disbenefits will be fairly and reasonably distributed among different sections of the population...
- Regional and urban development: transport system will support regional and urban development...
- Negative environmental effects: detrimental global and local environmental effects will be minimized...

New vision for transport system under development: Goal is well functioning transport with aspects like:

- Basic level of service
- Clear roles of different operators
- Number of harbours, airports ...
- Optimisation of transport system level (not by mode), functioning of transport system
- Sustainable transport
- "Right" / fair pricing and taxation
- Management of infrastructure + management of traffic
- Financing
- Acceptability
- Integration of logistic systems of companies and transport services

### *Important research programmes*

Clustering programmes coordinated by MoTC:

- AINO on real-time transport information 2004 -2007
- HEILI passenger information programme 2001-2004 (continues under AINO)
- Public transport interchange project (travel centres) -2007
- JOTU public transport research programme 2004-2007
- ELSA towards accessible transport 2003-2007
- DIGIROAD national road and street information system 2001-2004
- LINTU long-term R&D programme for road safety 2002-2005
- EGLO enhancing global logistic competitiveness of Finnish business and industry 2004-2007
- TEDIM logistics cooperation forum in the Baltic Sea Region -2008
- ITS Finland network 2003-
- More info from: [www.mintc.fi](http://www.mintc.fi)

Programmes of Administrations (Road, Rail, Maritime, Vehicle)

- TEKES programmes

### *Main research questions*

Information and Awareness related:

- Information services of public transport (cellular phone/mobile payment, route planning service e.g. Helsinki Metropolitan Area "ytv.fi")
- Weather information services (to drivers, contractors): real-time, warnings etc.
- Achievement of goal of fluent traffic using real-time information services (real-time measuring / satellite positioning, short-term and real-time traffic forecasting / modelling, information service on incidents, eCall, real-time traffic control / management etc.)
- DIGIROAD public services + added-value private services
- Long distance corridor information services (like in Euro-regional VIKING-project or regional TEDIM- programme): management of time and location across borders in international transport (mainly freight transport)
- Information services to customers: user needs, roles of public and private operators
- Effect studies of traffic management and telematics: how and what kind of information has effect to drivers etc.
- Development of traffic control centres (VTS, road traffic control centres, rail, air)
- Incident management on system level
- Information service from logistics chain point of view
- eLiike, i.e. all R&D concerning development of transport information management: management system for real-time information, automation of information exchange between different systems, internet pages for traffic information etc.

Information and Awareness related questions - very much the same things as in previous slide, taken from ERA-NET material (Delphi results):

- Development of intelligent in-car systems
- Increasing automatic driving
- Tracking and tracing will become more important
- More need for real-time dynamic user information systems
- Increasing market penetration of new technology
- Perceive the user as a customer
- Traffic rules; situation dependent rules and simplification/reduction signs&rules
- Integration transport services; multi modal info systems
- Travel information systems
- Improve transport related internet services
- International standards for timetabling of public transport

From more general point of view

- Financing model / models which gives possibility for long-run development of functioning of transport system
- Challenges of dispersing regional- and community structure to functioning and economical efficiency of transport system
- How to make specific features and needs of different regions visible in transport system plans / planning
- How to arrange public transport economically and with fair service level in regions with decreasing amount of customers
- Passenger transport system which serves aging customers
- Effects and importance of virtual participation / remote participation / remote work in reducing passenger transport
- Mobility needs of new work life and how to satisfy these needs: transport system of service society (demands, implementation)
- Customer orientation and interaction with customers in planning of transport system
- Logistics demands of changing production structure to transport system and management of transport infrastructure
- Management / steering needs and possibilities for division of labour between different transport modes
- Transport system for long-distance and thin freight flows as competitiveness factor
- Adaptation strategy of transport system for climate change, especially for extreme weather phenomenon / situations
- Transport system for growing awareness of environmental questions
- Into safe mobility through road- and vehicle technology solutions (concerns mostly road transport)
- Consequences of long-lasting competition of services to service level and service capability of transport system