10th April 2006

COOPERATION
7FRDP Specific Programme

SURFACE AND SATELLITE TRANSPORT RESEARCH ISSUES
(PRIORITY TRANSPORT)
FIRST WORKPROGRAMMES

Approved in Torino Assembly 6 and 7 April 2006

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Taking into account the fact that ECTRI, its members, the seniors of its members

- Have an active role in Surface Transport Technology Platforms (ERTRAC, ERRAC, WATERBORNE and eSafety forum), in Networks of Excellence APSN, HUMANIST and EURNEX
- Are often solicited as experts for the Member States (national, bilateral, multilateral programmes or ERANET transport project), for industries (ACEA, EUCAR, CLEPA, UNIFE…), for operators (ERTICO, UITP, UIC...) and other European associations (EARTO, EARPA, FEHRL, FERSI…), it is not surprising to see some of the proposal below expressed having been or to be also submitted by other intermediaries. This only proves that the Surface Transport European Research Area is moving and in construction.

The objective of this paper is dated and aimed in the general process of concrete elaboration of the 7FRDP. It is integrated in the preparation of the first workplan of 7FRDP for the surface transport part in IST priority, the surface transport part in transport and energy priorities and the specific programme COOPERATION.

It follows the ECTRI 2004 inputs for 7FRDP and the specific programmes COOPERATION, IDEA, CAPACITIES and PEOPLE.

It is organized following the bullets of the specific program COOPERATION, followed by the ECTRI input for COOPERATION Specific Program.

For each priority it is reserving a specific treatment for NoE ideas by subpriorities and big cooperative project ideas by bullets. Many of the cooperative project ideas are built as eventual modules of bigger projects and are classified by bullets.

As the writing down of the Environment and Energy priorities are not speaking at all or partially of transport issues, the ECTRI proposals on these issues are classified in the ICT and transport priorities bullets.

For NoEs and IPs ECTRI can provide one page detailing the idea.

About NoEs, ECTRI members and ECTRI are considering that this instrument is dedicated to the structuration of the focussed research (and eventually frontier research) supply side at European level (EU and national and regional level) ERANET and ERANET + are structuring the demand side and the European Technology Platforms (and eSafety Forum) are organizing a foresight exercise and a first step of the supply-demand dialogue.

The experience of ECTRI or ECTRI members is also that it is important to have other stakeholders than academia involved while not necessary being partner or integrating their research potential through Advising Board, Scientific Advisory Board or Stakeholders for a : it is critical for the Lisbon and Barcelona agendas.
It is also one of the big instruments to keep industrial Research and Development world headquarters in Europe through legibility and dialogue with academia (Universities or research institutions, networked around excellence and relevance).

As it is also critical of societal or policy oriented issues including better regulation issues to have such instrument use because it is pushing the agenda more in depth than coordination action instrument.
That is to say ECTRI is thinking that there is a need for new NoEs and also a need to maintain, for successful NoE, possibility of granting a second step of integration and dissemination activities.

Because of these matters, ECTRI is thinking that the treatment within the tasks list of NoE has to be carefully adequate even if it could not be written down in some similar wording than big projects: the aim is not the same.

Transport (including aeronautics) priority

I - Surface Transport (rail, road and waterborne) subpriority

1 - NoE Ideas

- (To support E Rail Agency) Safety and interoperability Rail research NOE
- Transit safety research NOE
- Urban Mobility NoE
- Urban and Periurban Roadway Road Safety New Approach (UPRWRSNE) NOE
- Multimodality or Intermodality safety NoE
- New traffic modelling and simulation including energy, GHG and ITS NOE
- New Kyoto round transport related research agenda NOE
- Transport Greenhouse Gas and climate change NOE
- Charging, Tolling, financing transport issues or transport infrastructure issues NOE
- Urban mobility economics NOE
- Intercity mobility economics NOE
- Intercity mobility societal issues NOE
- Goods transport and logistics economics NOE
- Risk and transport safety culture including road safety culture NOE
- Mobility and disabilities NOE
- Indicators of transport sustainability NOE
- Human factors in accident causation for all transport NOE
- Integrated Fatigue Management in the Transport Industry NOE
- Transport multimodality NoE
- Time use and mobility NoE
- Freight modelling in Europe (models forecast data) NOE
- Freight observatories NOE
- Goods tracing and tracking NOE
- Low-Noise Vehicle Design NOE
- Harmonization and comparison of transportation data NOE
- Harmonization and comparison on national transport behavior research surveys NOE

2 - Cooperation projects ideas

2-1 Cross cutting issues

IP

- Adaptive Support Systems to Sustain Mobility in an Ageing Society

2-2 The Greening of surface transport

Technologies and knowledge for reduced pollution

IPs

- Noise and tranquil areas
- Low-Noise vessels
- Advanced fuel cell power trains
- Advanced life-cycle control of rail vehicles

STREPs

- Emission of pollutants in bus engines fuelled with natural gas
- Lost automotive exhaust heat thermoelectric auxiliary power units
- Environmental and health risks of unruled pollutants from transport
- Impacts of the usage of alternative energy sources in transport
- Reduction of noise emissions by improved design to noise capabilities
- Leisure transport noise
- Noise control – general
- Psycho-acoustic based structural optimisation
- Intelligent noise abatement and control for the railway mode
- Virtual platform to assess visual and noise perception of transport infrastructure
- New technologies aimed at dust reduction
- Share of transport on production of the fine fraction of particulate matter suspended in the atmosphere
- Life cycle costs of existing tracks knowledge
- Use of waterborne transport means for niche urban freight traffic flows

Cleanliness of powertrains and fuels

IPs

- Complete lean design for environment
- Energy management and optimization system of vehicles
- Novel energy storage and recovery technologies for advanced propulsion concepts (advanced batteries and super capacitors)
- Reduction of friction drag by means of passive flow control devices
- Fuel cells light duty vehicles

STREPs

- Emission-sensitive area low-emission vehicle concepts for mobility concepts
- Energy efficient driving – eco driving
- Hybrid vehicle electrically feeding while in route
- Rail Vehicle Hybrid FRP Sandwich Modular Design
- System Reliability of Fuel Cells and Hydrogen Storage
- Fatigue of energy storage and recovery technologies for advanced propulsion concepts
- Components integration for advanced propulsion concepts
- Identifying and developing economic-ecological best practices and technologies to achieve positive balances in logistics processes supplying biomass from agriculture and forestry as raw materials for variants of energetic utilization
- Electrically catenary free driven vehicles for urban transport application
- Reduced noise rail system

System optimization

IPs

- Transforming the Transport Infrastructure in Europe with respect to a sustainable mobility
- Reducing noise and exhaust emissions by influencing driver behavior
- The impact of the introduction of hydrogen infrastructure and withdrawal of fossil fuel infrastructure on transport
- EMTRS Environment Management Tools for Railways Systems

STREPs

- Lightweight construction of light- and heavy-duty commercial vehicles
- Forecasting methodology of the environmental pollution emission from the road transport, with respect to sustained regional development
- Increase understanding of personal and societal impacts of increasing awareness (and legislation) of the “environmental footprint”
- Energy consumption and goods transport
- System level life cycle costs for rail freight bogies

2-3 Encouraging modal shift and decongesting transport corridor

Developing seamless door to door transport

STREP

- Combined passenger and good traffic train (GOPAX)

Interoperability and operational optimization of transport Networks

IPs

- Demonstration Facilities for Traffic Management (DEFTRAM)
- Interactions between drivers in traffic and their effects of traffic safety, traffic flow and the possible changes by ADAS functions
- Development of planning tools for intermodal transport networks

STREPs

- Capacity shortages and demand management
- Full cost recovery in the transport sector
- European benchmark and trends of infrastructures vehicle technology aimed at traffic information and traffic management
- Approaches for an economical and safe operation on secondary railway lines based on the real existent requirements and considering standardization
- Application of infrastructure based or vehicle based dynamic traffic information to support traffic management
- Inclusion of the behaviour of increasingly automated vehicles into existing models to investigate traffic flow and congestion effects
- Methods and conditions to maintain an extensive rail network for goods transport

Intermodal integration

IPs

- Warranted connections in public transports

STREPs

- Development of an education and training scheme of European Rail Logisticians
- Master plan for the transportation of dangerous goods by rail in Europe
- Decisions models for purchasers' use of intermodal transport

Optimization of the use of logistic and transport infrastructures

IPs

- IP Interaction between logistics and transport to goods intermodality using maritime chain

STREP

- STREP Improving operation productivity of rail freight transport

Intelligent system and new vehicle concept

IPs

- European architecture for Rail

STREPs

- Swap bodies for vehicles in the 2.5 t sprinter class, which can also be transported on normal trailers, are about to be launched on the market
- Swap bodies and basic vehicles will have integrated communications, identification and telematic functions (RFID technologies to track and monitor logistics assets)
- Intelligent video surveillance technologies for on-board trains passengers security
- Real time and personalized information for the traveler
- Improving rail rolling stock performance
- Public acceptance of rail vehicle design
- Global concept for a pleasant ride
- Comfort spec./Design guide

Knowledge for policy making

IPs

- Development of the infrastructure required for a sustainable transport system
- Scientific knowledge and data for social and economic justifications of modal shift in transport corridors
- Scientific knowledge for public debate and evaluation of modal shift
- Goods and people transport services purchase behaviors for the “last kilometer”

STREPs

- The development of ways of overcoming the barriers to the effective development and delivery of sustainable transport and land use strategies
- The impact of “pervasive” location, computing and communications on traffic operations

- New CBA analysis for traffic and infrastructure evaluation
- Further development of European standards for exchange of rail data to define and implement unified systems and procedures to exchange basic information on international trains running
- Evaluation of existing operation processes and technologies (rail)
- Europe-wide experience of forecasting rail demand
- Survival of the rail system by specialization
- Evaluating alternative railway structures
- Strategic evaluation of market potential of railways in a small number of freight transport segments and subsequent action plan
- Identification of favorable criteria to railway networks through the assessment of citizen participation to the decision process for transport infrastructure
- Waterborne project economic evaluation methods
- Optimization of the complementarity and the intermodality of air/HST
- Impact of transport policy devolution on transport, infrastructure, democratic policy control, economic efficiency, and regional development

2-4 Ensuring sustainable urban mobility

Next generation vehicle for goods and people Urban Mobility

IPs

- Low emission light duty vehicles powered by PEM fuel cells
- New clean and safe urban truck
- New light urban bus
- New generation of standard high level of service bus
- New advanced guided bus
- New clean urban car concept
- New automated underground
- Noise pollution and vibration should be addresses while upgrading components
- Safety, evaluation and certification harmonisation in guided public transportation
- Low emission Light Duty Vehicles Powered by PEM Fuel Cells

STREPs

Guided systems
- Green vehicle choice criteria for urban transport
- Adequacy between urban guided systems design and line characteristics in order to optimize costs
- From steel rails to optical rails: new developments in guidance technologies
- Smaller guided vehicles and PRT

Components
- Integration of hi-tech systems in the vehicles in order to reduce accident rates and better coordinate the vehicles schedule in the overall urban transport mobility system

- Integration of new components (motorization, energy, guidance, automation…) in order to reduce investment and/or operation costs, and/or improve performances
- Network on new approaches

New mobility concepts, innovative organisational and mobility management schemes including high quality public transport

IPs

- Impact evaluation of public transport services and public transport improvements on mobility
- Definition and optimization of technical and operational interface between infrastructure providers and operators
- Safety and security of the urban mobility system

STREPs

- Transforming the urban Transport Infrastructure in Europe with respect to a sustainable mobility: road maps to the future
- Integrated holistic concepts for the intermodal planning and control of small-volume transports to reduce business and business-related transport in urban areas
- Identifying and developing economic-ecological best practices and technologies to achieve positive energy balances in logistics processes supplying biomasses from agriculture and forestry as raw materials for variants of energetic utilization
- Investigation of the impact on citizen behaviour and traffic conditions of a variety of public transport improvement measures, sociologic studies on transport needs and their evolution
- Network optimization
- Optimization of the interchanges
- Freight transport and public transport: how to get the best from the network without impeding mobility. What innovative solutions?
- Intermodality between public transport networks and non motorized modes
- Coordination between mobility managers
- Optimization of “Kiss and Ride” in order to facilitate public transport utilization
- Intermodality between buses and guided systems (tram, metros, tram-trains, rail cars)
- Specific mobility requirements of different social groups: elderly, families…
- Optimization of Park-and-Ride systems
- Long distance commuting trips
- Door to door solutions for mobility impaired
- Car sharing organizations
- Effects of heterogeneous vehicles within a given fleet: on maintenance, on operation, on usage and user perception
- Stakeholders involvement in the mobility service: what cooperation between the different actors to deliver the best service for the traveler?
- Innovative solutions for governance of urban transport systems
- Creating incentives for innovative mobility providers to enter the market

- Managing numerous operators on a market: what cost? What cooperation between competent authorities?
- Bus system improvement
- Use of municipal rail networks for supply and disposal traffic

Quality factors

- How to make public transport services more customer oriented, to make them more attractive
- Comfort and accessibility of public transport vehicles
- User perception of 'seamless' trips
- Incident management systems
- Land use and goods and people transport

Clean urban transport

IPs

- Mobility concepts for emission-sensitive areas
- Fuel cell and hybrid bus
- Fuel cell and hybrid small bus
- Green mopeds

Non polluting modes, demand management, services

IPs

- Impact of ICT on travel behaviour e.g. how is the growth in internet shopping changing travel behaviour?
- Evaluation of the existing information system technology and centres
- Ticketing
- What integration, for which information system, in order to improve the system?

STREPs

- What parameters and what definition of an "acceptable walking distance" to reach the public transport system?
- Opening up of public transport market
- Impact of parking policies on mobility systems
- Parking policies and work places: what incentives? What constraints?
- Dynamic mobile information
- Implementation of information and communication technologies inside interchange stations
- Most effective content of information services to travelers
- Real time tracking and imaging of traffic/transport situations of all modes
- Validation of various ICT initiatives for complete travel journeys by the passengers (intermodal urban transport)
- How can ITS and transport and traffic management systems improve accessibility?

Tools supporting policy development and implementation including transport and land use planning

IPs

- Land value capture: how to evaluate, capture and invest it in public transport?
- Investigation of alternative funding schemes towards reduced congestion and more environmental friendly public transport
- Interactions between land use, traffic and public transport networks
- Analysis of the cost of urban sprawl and of external framework (traffic priority, city centre parking, road pricing…) in relation with public transport
- Cost and benefits of standardization

STREPs

- Tools for dynamical evaluation of road traffic noise
- Financial resources, such as public private partnerships, taxes…
- Revenue funding for on going operations (as opposed to capital funding)
- Development of comprehensive economic studies on externalities of urban transport projects
- Definition of harmonised criteria for impact assessment at European level
- Interactions between pricing and funding
- Understanding mechanisms influencing people and firms preferences for places
- Travel modes and space consumption
- What technical tools to understand and facilitate modal choice?
- More comprehensive mode choice models
- Contextual background and likely future conditions: demographics, societal development, implications of land-use trends
- New fares or pricing options: what innovative pricing solutions? Pay as you drive?
- Impact of awareness campaigns and alternative marketing ways
- Investigation of rail bonus and other specific mode demand STREP
- Pricing/fares structure of public transport: how to differentiate trips
- Life cycle cost optimization of particular public transportation systems (tramways…)
- Interactions between road pricing and public transport
- Impact of commercial activities inside public transport networks: how to improve economic balance and attractiveness of public transport?
- Public transport planning and settlement choices: how to take one another in to account
- Impact of public transport on social equity
- Organization of workers and labour in public transport companies
- System social optimization: fares, frequency, schedules…
- The impact of lifestyle changes and life stages on travel behaviour
- Industrial organization of public transport vehicle production
- Multimodal travel times
- New ways for developing railway networks based on the polycentrism concept
- Redefining land use strategies with regards to freight transport and logistics

2-5-1 Cross cutting, multimodal and intermodal issues

See ideas of NoEs

IPs

- Impact of ageing society on transport safety (behaviour, infrastructure, equipment …)
- Freight security (transport and content of the containers…)
- Integrated Fatigue Management in the Transport Industry

STREPs

- Congestion and safety
- Robust Design for safety: Development of new approaches for modelling the impact of variations in production processes (like variation of thicknesses of parts) on the crash safety properties auf automobiles, ships and railway systems
- Intelligent Level Crossing control
- Enhancing passenger comfort by management of jet-lag for transmundi travellers

2-5-2 Road safety research

Protect vulnerable persons

IPs

- Biomechanics
- Vulnerable road users protection
- Rear protection dynamic test assessment
- Needs and requirements of elderly and professional drivers for ITS
- Fatigue and professional diseases
- Enhanced passive safety with multifunctional materials – Smart Safety
- IP, STREP Crashworthy structures for a safe, environment-friendly lightweight vehicles

STREPs

- Advanced restrained devices
- Intelligent structures and materials
- Pedestrian protection directive need
- Car to car compatibility assessment methods
- Road Safety rules building and socialisation process for 2 motorized wheels
- Driving and older people

Advanced analysis systems and risk analysis

IPs

- European Road Safety Observatory
- Road Safety Attitude Observatory (SARTRE)
- Digital modelling and virtual testing supplementary to real cash testing
- Road safety issues vis a vis global hydrogen initiative

STREPs

- System reliability of pre-crash sensor systems

Accident research methodologies:

- Structural road safety models at regional, national and European levels (4th dimension)
- In depth accident analysis harmonization
- Elderly pedestrian European accident registry
- 18-24 year-old over representation accidentology registry
- Hot spot accident analysis (infrastructure based)
- European accident registers and registry

- Effect of ITS on behaviour and accidents
- Run off road crashes
- Safety analysis tools for highway agencies and research
- Self explaining roads
- Road status sensors
- Integrated Driver State Management
- “Fourth dimension” structural road safety models at regional, national and European levels

Integrative approaches

IPs

- Naturalistic driving observation to investigate driver behaviour and ITS use for favouring human centred design for ITS
- Integrated safety for Urban Truck
- Integrated safety for Bus
- Integrated Road safety for powered two wheelers including accidentology registry research, behavioral research and requirements for passive and active safety
- Integrated road safety and sustainability at local level (Urban)
- Road safety of ageing population on the move
- Speed management policies European benchmark including institutional and organisational issues
- Training and education along life scientific background
- Integrated safety and passive/active interaction
- Rural road layout controllability and legibility

- Aging road users (exposure data, self current tools for older driver, evaluation of remediation and rehabilitation program for older driver)
- Driving behaviour
- Development of test methods to enable the benefits of improved primary safety to be included in legislative and consumer testing
- Analysing driving behaviour to understand workload and errors of the drivers

STREPs

- Rescue and crisis management (real time traffic monitoring)
- Car to truck compatibility
- Crash compatibility MPV and SUV safety concern
- Safety implication of changing vehicle fleet and mix
- Cognition models
- Mental models of driving ranging from manual control to highly automatic driving
- Development and use of methods for predicting and measuring the effect of improvements to vehicle primary safety
- Road users' competences analysis for road design

Safety components of transport system

STREPs

- Mobility-accident modeling
- Highway furniture road safety level and criteria assessment
- Speed and heterogeneous traffic/road safety impact
- Evaluation of safety interventions
- Road safety impact of EuroNcap
- Impact of weather condition on traffic flow and safety

2-5-3 Security

IPs

- State-of-the-art of transport security
- Security management for trans-European freight transfers

STREPs

- Detection of situation, recognition, searching and tracking of a person across a transport network

2-5-4 Rail safety research

Protect vulnerable persons

IPs

- Development of simulation for passenger passive safety techniques and their verification with full scale crash tests of chosen types of rolling stock

Advanced analysis systems and risk analysis

IPs

- Safety Evaluation of operational rules. The operational rules of the different railway operating companies contain safety implications and have an important influence in the safety of the operation, which should be analysed and compared in this project
- Accident and incident database and learning system

STREPs

- Harmonization of the emergency procedure for engine drivers within European railways
- Reliability and optimization of mechatronics devices

Integrative approaches

IPs

- Harmonization of methodologies and criteria for the Cross Acceptance, Interoperability and Interchangeability based on simulation
- Europe wide interoperability testing platform

STREPs

- New technologies doe the measurement of vehicle-track forces for vehicle acceptance
- Ergonomic design of operations control centres
- Man and automation at railway transport - Stress and strain of engine drivers caused by diagnostic functions
- Harmonisation platform and integration approach for the different railway testing labs in Europe containing data exchange formats, interfaces and real time coupling of the labs
- Electromagnetic radiation from rail

Safety components of transport system

- **IPs**

- Improved high speed guided transport safety in crosswind by aerodynamic design optimisation

- **STREPs**

- Cost efficient manufacturing processes of ultra-lightweight railway structures for high speed regional transport under consideration of safety and environmental aspects
- Safety of Medium and High-Speed Wheelsets
- Accident prevention of hazardous freight traffic activity
- Braking of high speed trains
- More cost effective braking systems
- Electrical braking strategy
- Innovative self-diagnosing concepts for bogies
- Reduced rail contact forces
- New material
- Vehicle track interaction

2-5-5 Waterways safety research

Advanced analysis systems and risk analysis

- **IPs**

- Optimization of Maritime Watch (work) Schedules

- **STREPs**

- Risk-driven life-cycle performance management of vessels and off-shore constructions

Integrative approaches

- **IPs**

- Virtual simulation and testing for maritime technologies

- **STREPs**

- Structural Health Monitoring of vessels and offshore constructions

Safety components of transport system

STREPs

- Galileo Augmented Motion in Maritime Application: Using Galileo for safe localisation in waterways and in harbours for collision avoidance, search and rescue as well as for vehicle guidance and tracking and tracing of goods

2-6 Strengthening competitiveness including Better regulation agenda

IPs

- Cost-saving manufacturing techniques for metal-profiles under exploitation of the plastic deformability
- Rapid Prototyping of multi-material systems for small and specific batch production
- Development of a systemic foundation for mechatronic technology in railways
- Cost efficient manufacturing processes of ultra-lightweight railway structures for high speed regional transport under consideration of safety and environmental aspects
- IP or STREPs Modular lightweight construction of light- and heavy-duty commercial vehicles

STREPs

- Rapid manufacturing processes with bionic design rules
- Advanced vehicle structures and performance by use of hybrid multifunctional materials
- Towards a bio-dynamic and muscular digital human for computer-aided ergonomic simulation
- Rail Verified Virtual Vehicle Homologation Process
- Rail Verified Virtual Aerodynamic Homologation

II - Support to the European global satellite navigation system subpriority

1- Galileo application related issues ideas of NoE

- Satellite Communication and positioning application to guided transport NoE
- Satellite and terrestrial communication and navigation system hybridation (CNS) NoE
- Protection of privacy in Galileo applications

2- Cooperation projects ideas

2-1 Exploiting the full potential

IPs

- Galileo Augmented Motion in Maritime Application
- High precision Galileo based vessel navigation services
- Galileo based ADAS
- GNSS-based system for ground movement of surface transport (surface transport analogue project to ANASTASIA air project)

STREPs

- Galileo based maritime Automatic Identification System (AIS)
- Galileo based navigation services for swap bodies
- Galileo based service for security protection of civil airports
- Galileo based Railway Collision Avoidance System

III - International Cooperation

- To be defined for each task and subject to reciprocity
- System analysis and for the public policies except all that is linked to better regulation – opened to all
- human factors opened and subject to reciprocity only to OECD non European countries
- Systematic opening to acceding countries and WBC

IV- Emerging needs and unforeseen policy needs

ECTRI thinks that there will be a need to re- examine the work plan during the 7FRDP, when the White Paper on Transport and the Green paper on Energy will be updated and the Kyoto 2 agenda will be decided
It would be good that the projects anticipate the modifications