Finnish Road Administration Research and Development 2004

Revision of the 2003-2005 R&D programme

R&D

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Revision of the 2003-2005 R&D programme
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SUMMARY

The Road Administration research and development programme is based on the strategy adopted in 2002 and research priorities are set according to focal areas. The goal of research and development is to develop new knowledge and skills to improve the function, safety and competitiveness of the entire Finnish road transport system on a sustainable basis. The focal areas of research and development are:

1. Requirements of road users and other client groups
2. Impacts of road management and traffic
3. Asset management
4. Functioning markets for procurement of road works and services
5. Traffic management
6. Management of traffic and road network information.

The Road Administration is also responsible for the entire public road sector's products and services and R&D is also directed at these activities.

The research and development programme for 2003-2005 was adopted on 20 January 2003. The budget for 2004 is 5.2 million euros. The action plan has been revised on the basis of the proposals of the focal area and strategic project managers. The Road Administration Management Group adopted the action plan on January 19, 2004. To initiate the 2004 plan, the following basic allocation was decided:

<table>
<thead>
<tr>
<th>Category</th>
<th>Budget in euros</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic projects</td>
<td>1,175,000</td>
</tr>
<tr>
<td>Requirements of road users and other client groups</td>
<td>85,000</td>
</tr>
<tr>
<td>Impacts of road management and traffic</td>
<td>350,000</td>
</tr>
<tr>
<td>Asset management</td>
<td>700,000</td>
</tr>
<tr>
<td>Functioning markets for procurement of road works and services</td>
<td>160,000</td>
</tr>
<tr>
<td>Effective traffic management</td>
<td>300,000</td>
</tr>
<tr>
<td>Management of traffic and road network information</td>
<td>120,000</td>
</tr>
<tr>
<td>Sector tasks</td>
<td>1,210,000</td>
</tr>
<tr>
<td>Total in euros</td>
<td>4,100,000</td>
</tr>
</tbody>
</table>

Two strategic projects are under way in 2004: the Research programme for impact management and the Low-volume road economic maintenance programme. Feasibility studies will be made for projects on Developing and updating urban area main road design solutions and Bridge life cycle research and cost management.

Separate research programme decisions are to be made in 2004 for the focal areas Requirements of road users and other client groups, Functioning markets and Management of traffic and road network information. During the year, corresponding programmes should also be prepared for the focal areas Impacts of road management and traffic, Traffic management and Sector tasks.
FOREWORD

The Finnish Road Administration's (Finnra) R&D strategy for 2002-2007 was drafted on the basis of an evaluation of research plans carried out towards the end of 2001. The strategy was approved on 26 February 2002. Its focal points are Finnra’s operating principle and vision. The goal of research and development is to develop new knowledge and skills to improve the function, safety and competitiveness of the entire Finnish road transport system on a sustainable basis. Finnra focuses its activities on improving products and services that are based on managing the impacts of road administration and the needs of society. The activities are prioritised in six key areas. As Finnra is responsible for products and services of the entire road transport sector, its R&D is also directed at these. A research programme can be designated a strategic project if it has a significant role for Finnra, and if its costs are considerable.

The R&D programme for 2003-2005 was approved on 20 January 2003.

The 2004 activities and finance were reviewed on the basis of proposals put forward at Finnra’s R&D Cooperation Group meeting by theme and strategic project managers. Finnra’s Management Group approved the 2004 programme on 19 January 2004. The R&D programme was also dealt with by Finnra’s process owners’ meeting and seminar.

Helsinki 6 February 2004

Finnish Road Administration
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1 R&D PROGRAMME IMPLEMENTATION AND THE YEAR 2004

The first year budget for the Finnish Road Administration's R&D programme for 2003-2005 was 5.79 million euros. The programme has progressed as planned, but shortages of qualified staff among Finnr’a’s R&D personnel, as well as consultants and research establishment project leaders, often influence the themes. However, 97% of the budget, i.e. 5.64 million euros, was spent.

A majority of the programme’s projects are based on annual contracts within the framework of a 2-3-year plan of action. Approx. 30% of the contracts extend to several years. The number of these contracts has grown slightly during 2003, which has also increased the average contract value. R&D is implemented through projects by universities, consultants and research organisations. In 2003, the programme consisted of 358 contracts, the average value of which was 25,200 euros. Of this, an average of 16,400 euros was spent in 2003. 150 contracts extended over several years, with 81 continuing into 2004.

The R&D budget for 2004 is 5.2 million euros; the total proposal for projects and themes was slightly more than 6.7 million euros, i.e. 30% greater. Project appropriations will thus have to be adjusted, in keeping with the research priorities that were set at the time of adopting the R&D strategy.

- DECISION MAKING AND AUTHORITY

Finnra’s revision of the 2004 R&D programme was based on proposals for strategic projects and themes and was turned into a research and development programme according to the Management Group’s 19 January decision. Start-of-the-year themes will continue current projects and also begin new ones following the Management Group’s decision, within the framework budget. A project file must be prepared for each new project.

For the themes Requirements of road users and other client groups, Functioning markets for procurement of road works and services and Management of traffic and road network information, research plans still need to be considered and approved by the Management Group before new projects are initiated.

- FINANCE

The balance between strategic projects and themes is based on the research priorities of the strategy. Approved research plans (Impact management research programme, Low-volume roads research programme and Road asset management theme) are carried out, but due to the decreased R&D budget, their implementation may be slowed down.

Depending on the progress made in the various themes, the balance as actually implemented will change somewhat during the course of the year. January’s framework decision focuses on ongoing projects and those that will be implemented during the spring:
### Project/theme | Start-of-the-year framework decision (1,000 euros)
---|---
S12, main roads | 100
S13, impact management | 460
S14, low-volume roads | 615
Requirements of road users and other client groups | 85
Impacts of road management and traffic | 350
Asset management | 700
Functioning markets for procurement of road works and services | 160
Effective traffic management | 300
Management of traffic and road network information | 120
Sector tasks | 1,210
TOTAL | 4,100

In the themes Road users and other client groups as well as Functioning markets and Road network information, provision is made mainly for ongoing projects. The framework decision will be reviewed when the research plans have been finalised.

Other themes and project finance are reviewed when necessary. Progress and possible re-evaluation of the asset management theme are dealt with by Finnra’s Management Group during the spring. The structure of Sector tasks will be looked at in the light of the ongoing study on Finnra technical expertise demand. It is intended that the research plans of the Impacts of road management and traffic and the Sector tasks themes will be taken up by the Management Committee during the course of the autumn.

- **MODE OF OPERATION**
  
The programme’s implementation and finance will focus on multi-annual projects and decisions, and this will also be taken up in monitoring. R&D procurement and project management will be developed with the aim of decreasing the number of contracts and orders, to ensure a steadier speed of implementation throughout the year. Procurement practice will be developed as part of the procurement of expert services.

Participation of the regional road administrations in Finnra’s R&D work in assessing demand, programme planning, implementation and utilising of results will be strengthened through their regional cooperation.

Finnra participates in the development of traffic administration R&D cooperation. The aim is to widen the share of joint projects within the programme. Finnra’s international cooperation is strengthened through participation in CEDR and other cooperation bodies, and through cooperation with other Nordic road administration authorities.
2 STRATEGIC PROJECTS

Strategic project S4, the road structures research program, has been completed. Feasibility studies will be made in the course of the year for a new project on developing and updating urban area main road design solutions. It is also hoped that the project Bridge life cycle research and cost management can be made into a strategic project for the year 2005.

Strategic project S12, **Main road improvement solutions**, was completed in 2003. This project will be evaluated during 2004. The key points to evaluate will be progress of the project, its results and implementation. Solutions and test roads implemented during the project will be monitored during 2004-2006. The monitoring of test roads concentrates on dual carriageways and wide-lane roads. The functionality and safety of the wide-lane road section between Koskenkylä-Kouvola is closely monitored. For instance, the remaining junctions add to the accident risk along this section of the road. The effectiveness of directional road markings along the central reservation and roadside is being monitored. The cost of evaluation and monitoring is estimated at 155,000 euros.

According to the 2002 research plan, the objective of the **Research Programme for Impact Management** (S13) will change from filling gaps in impact knowledge to developing appropriate evaluation methods. As the research programme has progressed faster than anticipated, planned studies in the main focus areas will be redirected.

A central theme for 2004 is the conceptualisation and operationalisation of impacts, to create the methods needed for evaluating the different impact components. Methods are additionally developed, for instance for better describing the distribution of impacts and assessing uncertainty. Filling the gaps in impact knowledge continues, among others, by studying the impacts of road maintenance and daily care, and the impacts on industry. The studies into the utilisation of impact knowledge and describing the source information required in impact management continue. The 2004 goals must be reached on schedule to ensure the shift, in 2005, towards creating specifications, guides and methods of action. Approx. 15 studies will be completed in 2004. The estimated budget for this is according to the research plan, i.e. 460,000 euros.

The **Economical maintenance of low-volume roads research programme** (S14) will continue as planned; one 2003 project has been extended to 2004. The budget for this programme is 777,000 euros. The road management policy study focuses on the boundary between public and private roads and studying the viability of road management of low-volume roads. For road technology and maintenance, studies into frost damage, heavy-duty traffic and drainage will continue, as well developing the maintenance system. Finnra will participate in a TEKES project entitled New techniques for treating materials for road structures. Road maintenance development focuses on procurement and finance of road condition and weather services, as well as functional and technical product specifications are developed, with Savo-Karjala as a pilot region.
3 THEMES

3.1 Requirements of road users and other client groups

Information on journeys, transportation and development in different parts of the country are needed in order to develop the road network and traffic management systems. The needs of different groups of people vary enormously and are likely to change as a result of, for instance, demographic and regional development, changes in values and ways of life, developments in technology and many other factors. The Requirements of road users and other client groups theme focuses on the following fields of research: future studies, social and regional economy, logistics and demand studies segmented by population groups and sectors of industry.

The theme’s research planning provides a comprehensive study into the current situation and involved an extensive round of expert interviews. The theme steering group, to be set up in the spring of 2004, and the project leader to be chosen for the task, will develop the project further. It is intended that the plan will be decided by Finnra’s Management Group before the summer. Projects will be finalised when the research plan has been approved, but the annual programme is expected to cost between 350-400,000 euros.

At present, decisions have been made on Finnra’s shares for 2004 in two projects coordinated by the Ministry of Transport and Communications, ie. 75,000 euros related to the national passenger transport survey and 10,000 euros for the project studying transport intensity changes in the different sectors of industry.

3.2 Impacts of road management and traffic

As an expert body, Finnra has to be well informed on the state of the traffic system and the road network, and the effects on them of various actions. The effectiveness and effects of road management must be evaluated and described comprehensively from different viewpoints in support of planning and decision making. We also need better understanding of how the different benefits and disadvantages affect society and the environment. The viewpoints applied are people’s daily journeys, business transport, vitality of the regions and social expectations regarding traffic safety, environment and economy.

Besides continuing to improve knowledge and methods, the theme aims to provide new planning solutions and promote their effectiveness and monitoring. Research into traffic safety and the environment has an important role in studying the effectiveness of road management. The theme also includes study into social sustainability, traffic conditions and land use planning. The strategic project S13, in its turn, focuses on filling gaps in impact knowledge and developing better evaluation methods, standardising assessment whilst enhancing the use of impact information.
A biological diversity research programme (MOSSE) and an environmental cluster research programme (Eco-efficient society) have been started as joint cooperative efforts between various Ministries. Finnra will participate in some of the projects of these programmes; this is a good model for creating operational networks. Finnra also participates in two EU research projects (Progress, Scatter). Most projects last for 1-2 years and some of them are cooperation projects carried out with different practitioners in the field.

The theme’s research plan for 2004-2006 is being formulated and it is intended that it will be presented to the Management Group in the autumn of 2004. Preparations for the plan depend on progress being made in the Impact management research programme, and timing is therefore partly dependent on it. Cooperation also exists with the Ministry of Transport and Communications, and other transport authorities.

The theme’s planned projects can be divided into two sections, those implemented in the spring and those implemented in the autumn. The budget for the first part of the year is 350,000 euros. The research has been divided into three parts: Monitoring and development of road and traffic conditions, Effectiveness of actions and Development of evaluation procedures and methods.

**Monitoring and development of road and traffic conditions** develops the information gathering methods and improves the utilisation of existing information. This results in monitoring information and databases to support planning. They can be utilised in reporting the state of the road traffic system and justifying the need for road management. Needs have been identified in the eTLOS project and work continues on determining the key information types. There are projects in the following theme areas:

- development of indicators and key data concerning the impact of road management activity (spring)
- current and future uses of traffic flow information and requirements for quality of information (spring)
- road safety information and utilisation of available information (spring)
- utilisation and management of information concerning the state of the environment (noise and ground water in particular) (spring)
- cooperation projects connected with traffic safety and preliminary studies into preparation of traffic safety policy (spring).

Impact management research promotes the **effectiveness of actions** and efficiency of design solutions. The focal area also includes before-and-after studies of various measures. They result in best practice solutions and information for impact assessment. The studies serve compiling guidelines and quality standards for road and traffic engineering and developing impact assessment. New projects are:

- EU projects on traffic and land use (spring)
- impact of road management and traffic on nature and biological diversity (spring)
- effects of automatic surveillance on speed and traffic safety, monitoring (spring)
- analysis and processing of safety information acquired in the speed limit studies and main road corridor studies for use in planning and design (autumn)
- environmental issues in the development of procurement (autumn)
- monitoring methods of different actions with regard to safety (autumn).

The emphasis in **development of evaluation procedures and methods** is currently on developing methods used to assess traffic safety and the impact of the action and finance plans. Research results and planning methods are obtained through the Impact management research programme. New projects in the plan are:
- development of action and finance plan impact evaluation and utilisation of results (spring)
- revision and update of unit values (driving costs) of socio-economic calculations (autumn)
- development of safety models in different programs (IVAR, TARVA) (autumn)
- social impact assessment (autumn).

The cost structure of these projects is as follows:

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impacts of road management and traffic</td>
<td>150</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td>Monitoring and development of road and traffic conditions</td>
<td>260</td>
<td>200</td>
<td>160</td>
</tr>
<tr>
<td>Effectiveness of actions</td>
<td>130</td>
<td>120</td>
<td>110</td>
</tr>
<tr>
<td>Development of evaluation procedures and methods</td>
<td>540</td>
<td>550</td>
<td>490</td>
</tr>
<tr>
<td>Total (1,000 euros)</td>
<td>540</td>
<td>550</td>
<td>490</td>
</tr>
</tbody>
</table>

### 3.3 Asset management

The programme proceeds according to the research project plan approved on 20 January 2003. The research programme is intended to create the information base and management methods needed for road asset management and to develop a systematic mode of operation, by which the road network can be managed more effectively throughout its lifecycle. The research programme was revised in January 2004 on the basis of the first year’s experiences and the changes that had taken place in the operational environment. The research programme’s focal points are:

1. **Information management and development**
   Information management includes the determinations and methods used in road asset information gathering, as well as the registers and their data quality. This part of asset management also includes specifying and calculating the value of assets (both book and service related value) and improving the way it is calculated. The following aspects of asset management are to be developed:
   - information gathering and condition assessments
   - registers
   - value of road network
   - service level classification.

2. **Development of road asset management methods**
   Asset management methods are primarily various network and programming management systems. Models for deterioration, action thresholds, driving cost and others parameters are also developed under this topic.
The impact of road management and condition is examined to the extent that they are not included in the Impact management research programme. Development of methods comprises:

- management systems
- models and methods of analysis
- utilisation of the road asset value.

3. Enhanced utilisation of information

Utilisation of information means developing and unifying road management policies, developing road management goals, information service and marketing, supporting Finnra's own experts and developing their skills. The utilisation of information covers:

- road management policies on upkeep and maintenance
- management objectives for road network condition
- information service, reporting
- marketing
- training.

4. System integration

The different aspects of road asset management have up to now been dealt with separately and unequally. The key aspect of asset management is comprehensive planning of road management. This focal point of development concentrates on integrating repair and replacement investment management and expanding asset management to other areas of road management. It is also important to study the effects of new procurement models (outsourcing, long-term management and maintenance contracts, functional quality standards) on asset management. The following are key aspects of asset management:

- description of target state and operating model of asset management
- integration of repair and replacement investment management
- expanding management to other road management product groups
- effect of new procurement models on asset management
- development of an umbrella system.

Action plan for 2004-2006

The research programme was revised in January 2004. Some of the 2005-2006 funds were left unallocated, as it is clear that new research needs will emerge over the course of the research programme:

<table>
<thead>
<tr>
<th>(1,000 euros)</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Project management and coordination</td>
<td>60</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td>285</td>
</tr>
<tr>
<td>1. Information management and development</td>
<td>320</td>
<td>240</td>
<td>100</td>
<td>80</td>
<td>740</td>
</tr>
<tr>
<td>2. Development of asset management methods</td>
<td>210</td>
<td>165</td>
<td>190</td>
<td>130</td>
<td>695</td>
</tr>
<tr>
<td>3. Enhanced utilisation of information</td>
<td>80</td>
<td>120</td>
<td>150</td>
<td>110</td>
<td>460</td>
</tr>
<tr>
<td>4. System integration</td>
<td>30</td>
<td>100</td>
<td>150</td>
<td>100</td>
<td>380</td>
</tr>
<tr>
<td>To be allocated as necessary</td>
<td>-</td>
<td>-</td>
<td>35</td>
<td>205</td>
<td>240</td>
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<tr>
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<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>2,800</td>
</tr>
</tbody>
</table>
3.4 Functioning markets for procurement of road works and services

Finnra develops and implements procurement methods to facilitate the emergence of functional and healthy markets for road works and services. Advanced procurement procedures support the innovation of consultants and contractors in service production, leading to increased productivity. For the research area, it is important to develop new product and service concepts, new tender evaluation principles and service provider selection criteria, systematic quality standards, quality assurance and procurement information management.

The theme’s research plan has been prepared in connection with the 2004-2007 service procurement procedures and information management development plan. The theme’s steering group and project manager will be appointed in the early spring. The plan will be decided by Finnra’s Management Group during the spring.

The following continuing projects are included in this theme during 2004:

- MIDAS, a cooperation project studying de-icing chemicals replacing salt use. Finland’s Environmental Administration is responsible for this study. The study results will be published during the 2004 Winter Road Congress
- impact of de-icing chemicals on pavements, a TEKES project in cooperation with Finland’s Civil Aviation Authority
- the intelligent roadworks site
- infrastructure data models and specifications, Infra-RYL
- life cycle assessment in road management procurement procedures
- assessment of the functionality and development potential of alternative implementation models of infrastructure projects (INKA).

The theme’s costs will in 2004 be approximately 420,000 euros, of which ongoing projects account for 100,000 euros and the forthcoming customer satisfaction bonus project 60,000 euros. Besides R&D, the new projects contain elements related to development of processes and computer programming investments, which have so far not been specified.

Developing a customer satisfaction bonus for regional contracts

The service character of regional contracts makes it important to motivate contractors to serve road users better and to develop their activities continuously with respect to quality and external effects. This is highlighted in low-volume road networks, where quality standards are not as strict as on the main roads.

The work is intended to develop a bonus system that suits regional road maintenance contracts, encouraging contractors to take road users into consideration and to provide a good service. It must first be determined what factors the system needs to consider and how this can be achieved in order to provide a reliable assessment of road users’ satisfaction and the actual quality of service provided by contractors. The work was started in January.
**Risk analysis**
The exact project brief will be defined in February 2004. It is likely to contain risk management pilot studies, risk management training and tools, or in-depth studies on the road management product range, for instance. The latter means defining an overall picture, distinguishing total risks by product, and by procurement entity. Follow-up work is intended to create a practical link between detailed tools and working models and future operations.

**Quality control**
Demands for functionality and product implementation require further development of quality management. The aim is to automate quality control and monitoring as far as possible and link them as an integral part of the product. Another focal area of the project is establishing appropriate quality control principles: what needs checking, which methods should be used and at what stage, during or after a road contract? Improved quality control is a prerequisite to the completion of the procurement strategy.

**Electronic commerce**
Electronic procurement covers everything from the initial call for tenders to the eventual selection of a service provider. The concept includes among others:
- management of procurement information
- preparation of calls for tender
- carrying out calls for tender
- evaluation and handling of tenders
- preparation of contracts and contract negotiations
- execution of contracts, collection and upkeep of information regarding the contract and quality control
- preparation of new contracts on the basis of available information.

**Management of project information**
Road management procurement information includes all products related to road management, road traffic services, repairs, maintenance and investments, which are currently handled in various ways and in separate information systems. Repair and maintenance are procured as large-scale regional contracts. On the other hand, small maintenance and investment projects are combined into larger projects. The amount and extent of interaction grows and the resulting data must be linked with the road management procurement information. Steering will move from single-project planning to defining and balancing the principles of precise impact.

**Modelling of market information**
Finnra must actively follow the market situation in the field and ensure procurement is done at cyclically favourable times. Finnra has conducted market analysis and arranged for monitoring of the market and operating environment information. The utilisation of market information in procurement activities does however presuppose systematic modelling of information and comprehensive management of business data. Finnra participates in the two-year COMBI project, partly financed by TEKES, with Finland’s Technical Research Center (VTT) and Tampere University of Technology. Finnra will also develop a market information model, to provide a tool for the decision points of the procurement process, such as timing of purchases, selection of contract form and choosing a contractor.
VISI
VISI is a Dutch construction sector information and communication system. It aims to develop procurement procedures and promote networking among the practitioners in the field. Uniform information models are required for the practitioners in order to ensure flexible transfer and utilisation of data. The goal also includes the use and adaptation of technology to improve the tendering process to better correspond with the latest contracting models and demands for functionality. The project starts with an evaluation of the system's suitability for Finland's infrastructure markets; separate decisions will be made on the possible application of the system.

Evaluating service provider network's ability to produce quality
The procurement strategy contract models presuppose close and unbiased cooperation between planner, main contractor and subcontractors. It demands the development of new cooperation models for the field, and also ethical rules of play. Fintra's own procurement activities play a part in promoting cooperation. This study is intended to create the procedures and evaluation principles, through which the production of quality and cooperation skills of service provider networks can be evaluated during tendering as part of the selection criteria. Such criteria have already been created for the metal industry and electronics, among others.

Development of a cooperation model for infrastructure projects
In the field of infrastructure projects there are no traditional unbiased inter-party cooperation models. This study is intended to pave the way for a new kind of cooperation culture. The study charts the barriers for cooperation and networking and creates models of action for their removal. The earlier mentioned VISI study has the same goal, but concentrates on easing the flow and transfer of information between different parties as a means of creating favourable operational preconditions.

Developing the use of lane rental
Lane rental is a method of minimising the nuisance caused by roadworks and is used to improve the efficiency of implementation. Any bonuses and deductions must be based on the increased cost to drivers resulting from the works. Procedures are needed to evaluate tenders with respect to functionality, effectiveness and cost of the proposed traffic management.

3.5 Effective traffic management
In traffic management, R&D focuses on providing basic services, i.e. traffic information and development of incident management control, and on securing the creation of these services, that is, developing traffic control centre activities and up-to-date monitoring systems.

During the next years, two of the three focal points, real-time information services and improving the basis for commercial information services, support the goals of the MTC transport telematics programme (provisional acronym 'Aino'). The goal of the third focal area, traffic management in major urban regions, is to promote efficient and effective traffic management by promoting cooperation between authorities and key municipalities in urban areas. The projects and their goals for 2004 are as follows:
Basic structures of traffic management
- Development of cooperation between incident management and authorities, and definition of traffic management system architecture.

Real-time monitoring of traffic conditions
- Development of models for monitoring and forecasting traffic conditions and traffic.

Traffic control
- Development of traffic control systems adapting to changing conditions.

Traffic information
- Development of a communication system dealing with information on weather conditions, traffic and traffic disruptions.

Impact evaluation
- Study into traffic management methods, particularly traffic-related and social effects of variable control systems and message signs.

The theme’s 2004 costs are expected to be in the region of 500,000 euros.

3.6 Information management

The information management focal area deals with developing a broad spectrum of information and data services concerning the traffic system, road management control, planning, design and procurement, serving the other processes and sectors of the Road Administration. Finnra also develops its own web-based information services, which are offered to various user groups. The drafting of an information management research plan requires further careful consideration. It may be taken up in the autumn.

Finnra’s 2004 share of the Infra model project plan’s funding is 120,000 euros. The Infra 2010 programme is expected to generate new projects in 2004. The future of these projects is to date undecided.

3.7 Sector tasks

In Finnra’s field of research, the so-called sector tasks consist of technical development for the key processes, mainly procurement and design, as well as R&D activities associated with larger problem areas in cooperation with other stakeholders, the Ministry of Transport and Communications and other agencies, universities and organisations in the field. Sector tasks also include Finnra’s participation in international cooperation and marketing of operational results to Finland’s road and traffic sector through the Tiennäyttäjä journal, among others.

Finnra’s vision of being an internationally valued expert in road management and developer of traffic systems is embodied in the organisation’s sector tasks. They also illustrate the diversity and complexity of the road traffic system; the tasks cover not only functionality of roads and bridges and the associated technology, but also traffic safety and different technological viewpoints. The start-of-the-year structure of Sector tasks looks like this:
Projects that can be seen to benefit traffic safety the most are annually selected for the long-term *road safety research and development programme* (LINTU). The programme got underway in the spring of 2002 and the first projects started in the autumn of 2002. The programme will continue until the end of 2005. The Ministry of Transport and Communication is primarily responsible for the project, but funding is also received from Finnra and the Vehicle Administration. Finnra’s annual share of the funding is 120,000 euros.

With regard to *structures and equipment*, major projects for 2004 are:

1. Changing specifications and quality standards to correspond with new forms of contracting
   - a new guideline for structural design and associated quality standards will be issued
   - work will start on the guidelines for structural improvements and associated quality standards
   - drainage and pipe structures, quality standards for pipes and manufacturers’ dimensioning calculations will be finalised
   - lighting, specifications and quality standards are finalised
   - contractor quality reporting, the essential elements of quality standards will be determined.

2. Others
   - use of industrial by-products, guidance to regional road administrations on new legislation, quality standards and risk sharing
   - test roads and structures, drainage, some monitored sites
   - verifying the performance of concrete safety barriers
   - maintenance of noise barriers, only activated if a joint project is convened.
   - equipment lists of plans, promotion of electronic information management in contracts, only activated if a joint project is convened
   - CEN reports.

The value of this focal area is 110,000 euros for the ongoing projects and 133,000 euros for new projects.

The main issues related to *quality demands on road surfaces* are:

1. Road surface performance requirements
   - a rutting model will be prepared based on the 2004 rutting studies and analysis. This will produce target values for groove depth whilst taking into consideration low-noise road surfacing and changes in the volume of traffic or vehicle speed in a repair-responsibility contract
   - a study on how to define crossfall information in a contract, and determine crossfall improvement needs of a particular road network

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<table>
<thead>
<tr>
<th>Themes</th>
<th>Value (1,000 euros)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structures and equipment</td>
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<tr>
<td>Quality of road surfaces</td>
<td>100</td>
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<tr>
<td>Geotechnical engineering</td>
<td>80</td>
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<tr>
<td>Traffic engineering</td>
<td>320</td>
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<tr>
<td>Bridges</td>
<td>420</td>
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<tr>
<td>Road safety: LINTU</td>
<td>120</td>
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<tr>
<td>Tiennäyttäjä and general expenditure</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,210</strong></td>
</tr>
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</table>
- a trial using a surface damage metering, conducted in cooperation with those responsible for the road condition register; the results are compared with previously used procedures. Repair-responsibility contracts cannot be adopted without this new method of measuring.

2. TEKES projects
- road service life: Common service life models are looked at and a standard approval process is developed for new stabilisation methods
- road deformation: Responsibility for dimensions is transferred to contractors and a calculation procedure is developed, which the contractors can themselves improve.
- low-noise road surfacing materials: Results are introduced and the noise calculation model updated.

The approximate cost of this focal area is 110,000-145,000 euros.

Geotechnical engineering projects are generally joint projects and the majority of them partially financed by TEKES. Finnra will participate in projects to develop quality standards or support the setting of such standards. Finnra is active in the following areas:
- mitigation of traffic-induced vibration (setting limits, base strengthening methods); joint projects LIIKEVÄ, LITES
- measuring change in the longitudinal gradient of roads (developing quality standards and the measuring method)
- life cycle cost assessment (life cycle costs of foundation engineering); cooperation project
- CEN standardisation (development of quality standards); cooperation project
- geotechnical engineering calculation program development; Finnish/Norwegian cooperation project
- bedrock and the environment (environmental impact assessment); cooperation project
- functionality systematics and quality standards of excavated spaces (development of contract procedures); cooperation project
- KallioINFO (creation of an internet database, user interface); cooperation project

The cost of this theme is approx. 105,000 euros.

Traffic technology projects deal with
- methods of controlling driving speed in rural areas and in towns
- design safety audits and safety assessment of existing roads
- safety impact of roadside advertisement and other distractions
- safety impact of road structures and road sign designs
- safety standards of road tunnels
- road design specifications (tunnels, cross-section selection and calculation, staggered junctions in basic road network, service facility signage, direction signs).

A study will be prepared on the structure and content of the guideline system. The budget for traffic technology is 460,000 euros, of which 95,000 euros is earmarked for ongoing projects.
The R&D of the bridge sector in 2004 will be divided into five main themes. The themes are:

1. Specifications and quality standards of planning
2. Specifications and quality standards of construction
3. Specifications and quality standards of repair, upkeep and maintenance
4. Life cycle research
5. Bridge safety and reliability

The themes have been developed according to the 2003-2005 plans by re-allocating them into more uniformly sized entities of approximately similar content. The financing of individual projects within the themes has been divided into three classes of importance: class 1 is projects that were listed in the start-of-the-year budget, class 2 is supplementary projects that fall within the estimated total budget and class 3 is other projects considered necessary during 2004.

Class 1 mostly includes projects that are already commissioned, and several minimum cost level projects that are perceived as particularly important in the coming years, such as the adoption of Eurocodes and the development of quality standards for various materials and bridge repair projects. Product requirements will in the coming years be developed particularly with regard to the requirement for functionality, which demands a substantial investment.

This class also includes new or expanding projects, such as a feasibility study entitled ETSI and a bridge monitoring project, which will involve Finnrna in 2004 in a European research project entitled Sustainable Bridges.

Class 2 mostly includes supplementary funding for ongoing projects, and a few new projects. Depending on total funding for 2004, new finance will also be allocated to providing specifications and quality standards for repair, upkeep and maintenance resulting from an expanding bridge repair programme, and to enabling changes in procurement procedures.

In life cycle research and cost management, attempts are made to develop a separate strategic project for 2005 in cooperation with the Road asset management research programme.

<table>
<thead>
<tr>
<th>(1,000 euros)</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
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<td>30</td>
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<tr>
<td>- for construction</td>
<td>125</td>
<td>55</td>
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<tr>
<td>- for repair, upkeep and maintenance</td>
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<tr>
<td>Life cycle research</td>
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<tr>
<td>Safety and reliability</td>
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<td></td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>420</td>
<td>115</td>
<td>180</td>
</tr>
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Tiennäytäjä, the FinnrA research and development journal, is published 6 times annually. Estimated cost 45,000 euros.*

The impact of dividing the Finnish National Road Administration, into the Road Administration and the Road Enterprise, on research and development activities should be assessed. The assessment would focus on how the division of tasks has been implemented and on the impacts of the division on, for instance, the implementation of test roads and the development of procurement procedures in the field, but most particularly on the contractors' own development. It is hoped to undertake the assessment in 2005.

* The Finnish Technology Transfer Center publishes a corresponding quarterly, Finncontact, in pdf form, see http://www.tiehallinto.fi/finncontact.htm. The Center (FinnT2) is a cooperation organization for international and domestic technology transfer in the road sector. FinnT2 also serves as a communication forum between organizations, people and cultures in the sector. The newsletter is published to inform about road technology, highlights in technical and management issues, written and visual material available, and training.
4 REGIONAL ACTIVITIES

Regional road administrations conduct projects related to research and development activity
- as a part of Finnra's R&D programme
- as a part of the regional development programme of the road authority and its partners
- as a part of road management or road project requirements, e.g. in monitoring.

Only projects directly connected to the R&D programme are included in centralised programming, funding and reporting. The needs of these projects are determined by the process owners within the core processes. Details of these can be found in the research plans of the relevant themes. For other projects, the region and the R&D coordinator together ensure that their programming, progress and results are adequately reported. R&D is comprehensive; the results of regional innovation must be registered and made available to the entire administration.

4.1 Uusimaa, Turku, Häme

A slip road trial is being planned in the Uusimaa road region. In Porvoo, potassium formiate will be tested for de-icing slippery roads. This is done in cooperation with Kemira and the Road Enterprise; Finnra will cover 50% of the costs that are perceived to exceed the traditional method. A report on decreased use of salt in important ground water areas will be completed in 2004. The Nummi regional contract pilots comprehensively priced maintenance of gravel roads. The Frost monitoring project seeks to clarify how Finnra monitors the depth of freezing on the road network.

In Turku road region, traffic safety has been promoted under the responsible leadership of the county's traffic safety consultative committee. The parties are adopting goals in order to improve traffic safety according to a balanced scorecard in 2004. One example of this is the use of a 'Highway 8 theme package', in which road safety can be promoted in various ways. In charge of the implementation of this theme package are roadside municipalities, the police and Finnra.

A preliminary agreement with the region's universities has been signed. The first completed cooperation project was a market report on possible tendering of ferry traffic.

Häme road region is responsible for the following national R&D projects:
- Utilisation of client information
- Measuring the level of maintenance service of secondary road networks.

The road region wishes to promote the following projects in 2004:
- Continuation of the Aitosavi project
- Better management of frost damage.

Three R&D seminars will be organised by the three regions:
- Indentation
- Frost damage
- Life cycle procurement model.
The regions will additionally organise a traffic seminar for decision makers in the spring of 2004.

4.2 Southeast Finland, Savo-Karjala, Central Finland

Southeast Finland region implements projects within the traffic management theme.

Savo-Karjala region is considering the following projects:
- Functionality standards of gravel roads; part of the low-volume roads research programme (implementation as yet undecided)
- Client satisfaction bonus in regional management contracts; part of the road management markets theme.
- HDM 4 multi-criteria analysis on low-volume roads management
- Utilisation of geographic information systems in Savo-Karjala’s regional and link road management

The goal is first and foremost to focus personnel resources on national projects.

The projects of the Central Finland region:
- Forest cluster transports and road management: The goal is to determine the needs and expectations of forestry and the wood processing industry, particularly regarding road management and the condition of the road network. The project will be completed in 2004. Partial projects are Roadex, mentioned below, a feasibility study into the current state and strategies of forestry with relation to road management and traffic services, and graduate research into wood chip and harvester transportation. A feasibility study on the current situation and strategies of forestry logistics was started in 2003 and will continue in 2004. Two graduate studies have been completed and there have been meetings with representatives of the forestry industry. A pilot location is sought for combining roadside clearance with production of wood chip for energy generation.
- The Roadex 2 project aims to develop better ways to predict and prevent frost damage. This Interreg project continues until the beginning of 2005.

4.3 Vaasa, Oulu and Lapland

- Vaasa, Oulu and Lapland regions’ service level of gravel roads: The current situation and special features of northern regions' gravel roads are studied using available registers, literature and through interviews; guidelines are sought for developing these roads.
- Oulu region: The Recycling crushed asphalt in road management project studies financial and operational prerequisites to reuse the asphalt in road improvements and paving.
- Vaasa region continues the monitoring and implementation of previously approved projects.
- Lapland region has no new projects.
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S14, Low-volume roads  Lasse Weckström  2011

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