



Road Traffic Management Strategy

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Abstract

The road traffic management strategy determines the objectives, roles, responsibilities, operational principles and service portfolio of the Finnish Transport Agency and the Centres for Economic Development, Transport and the Environment. This strategy takes into account the organisational change in the transport administration implemented at the beginning of 2010, the national strategy for intelligent transport, and the current challenges in terms of transport system development.

Based on primary customer needs and transport problems, the strategy outlines the main anticipated impacts of traffic management services and functions in different parts of the road network. This is followed up by the identification of the most cost-effective traffic management functions and services as well as the parts of the network in which these should be applied in order to achieve the desirable impacts.

Active network operation will ensure the predictability and reliability of travel and transport in all conditions, through the prevention of incidents and the minimisation of their impacts. In this respect, the most important tools are traffic control, traffic information and incident management.

Ensuring safe mobility will reduce the number of road fatalities and injuries, enhance the overall level of safety and security, and improve compliance with traffic rules and regulations. Primary tools for such purposes include safety related information services, traffic control, enforcement and in-vehicle driver support systems.

Promoting public transport, pedestrian and bicycle traffic will improve the attractiveness of these modes, restrain car traffic growth, combat climate change and improve the mobility of e.g. children and the elderly. In this respect, signal priorities for public transport, multimodal travel planning services, high-quality public transport information and, in the future, road use charges are important tools..

High-quality real-time data on transport system status forms the essential basis for all traffic management services. Such data contain the current and short-term (15 min – 2 h) predicted status of the transport system.

In the operating methods, cooperation between the different parties is emphasized as well as ensuring organisational and operational prerequisites for services and functions needed for the consistent good performance of the transport system.

Foreword

The road traffic management strategies take account of the transport administration's organisational change implemented at the beginning of 2010, the national strategy for intelligent transport and the challenges involved in the development of the transport system. In this respect, the main challenges lie in combating climate change, in the proliferation of intelligent vehicle systems and in the changing roles and responsibilities of various parties.

In comparison with prior strategies, major changes concern taking responsibility for the active operation of the road traffic network, including traffic management plans, providing high-quality situational information on the road transport system, and coordinating incident management development.

In addition, new strategies include participation in public transport services and the clear concentration of measures in urban areas, key sections of main roads and special sites.

A separate report, "Road Traffic Management 2015, Background Report for Strategy Creation", has been drawn up in support of strategy creation. This report includes information on the backgrounds of the chosen strategies, impact and cost information on traffic management services, a description of the target state of road traffic management and impact assessments of the tested action packages.

These strategies replace the prior road traffic management strategies.

Helsinki, June 2010

The Finnish Transport Agency

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1 Traffic Management as Part of Road Management

Traffic management measures are aimed at improving the safety and flow of traffic, reducing traffic emissions and utilising traffic artery capacity more effectively. Traffic management is used to curb demand for transport and affect the selection of the mode of transport, route, or the time of travel or transport. In particular, it is utilised during the first stages of the four-step principle applied in the development of traffic conditions.

Traffic management comprises the following elements: traffic information, traffic control, incident management, demand management, driver support and monitoring, and fleet and transport management. It also requires reliable, up-to-date status information on the transport system.

Traffic information offers up-to-date information for road users, both before and during travel. The information provided covers topics such as weather and road conditions, road maintenance, traffic incidents, traffic situation and alternative modes of travel.

Traffic is controlled per intersection, road section or the entire road network. Traffic control is divided into fixed and variable traffic control.

Incident management concerns the detection, handling and elimination of traffic incidents, such as accidents, in co-operation with various authorities.

Demand management is used to affect choices in the destination, time, mode of transport or route of travel or transport. Means of achieving this include regulating access or parking, arranging park-and-ride facilities, supporting carpooling, promoting public transport and pedestrian and bicycle traffic, providing traffic information and using peak-hour tolls and other road use charges.

Monitoring systems include automatic speed and intersection control, monitoring transports of hazardous materials and automatic lane-use monitoring.

Driver support systems comprise IT and communications technology applications, providing assistance to the driver. These include collision prevention, support for lane keeping and navigation systems.

Fleet management covers the planning, monitoring, control and assessment of the movement and operations of a vehicle fleet and its drivers. Transport management involves the management of transport chain operations and information flows.

2 Traffic Management – Goals and Problems to be Solved

With regard to road traffic management and strategic customers, the road network can be divided as follows:

- major metropolitan areas 700 km (Helsinki Metropolitan Area, Tampere, Turku, Oulu)
- other metropolitan and urban areas 600 km (around 15)
- key connecting sections of the main roads 2,500 km (excluding urban areas)
- other sections of the main roads 9,700 km
- basic network in rural areas 65,000 km
- special sites, such as tunnels and sections subject to traffic congestion

The functioning and traffic safety of travel and transport chains between the regions and inside urban areas are essential to providers of goods transport and passenger traffic services, foreign trade and work travel in all sections of main roads, metropolitan areas and special sites. In rural areas, the basic safety and transport needs of the forest industry's timber procurement are emphasised with respect to the basic traffic network. In addition to the basic network in rural areas, schoolchildren's basic transport and safety needs apply to all urban areas.

The aim is to solve the most significant problems besetting the road transport system, while striving for goal and customer orientation. Some major problems – traffic's poor energy efficiency, its high impact on climate change, the aging of motorists and disregard of traffic regulations – are evident throughout the road network.

On main road sections, key problems are insufficient adaptation of behaviour to suit the conditions, meeting and encroachment accidents, accidents during the winter and dark period, poor predictability of travel and transport and insufficient backup routes. In addition to the safety problems listed for main roads, the basic network in rural areas is marred by the poor safety levels perceived with respect to school travel, problems in the loading and storage of timber, the poor condition of roads and the low level of the daily servicing and comfort of road use.

In metropolitan areas, the key problems are pedestrian and bicycle traffic accidents, the perceived lack of safety in school travel, the difficulty in predicting travel and transport, environmental issues, poor functionality of travel chains, deteriorating conditions for pedestrian and bicycle traffic and public transport, and the increase in passenger car traffic. Major metropolitan areas also suffer from traffic congestion and incipient shortages of space reserved for traffic.

Problems in special sites such as tunnels, road sections subject to congestion, roadworks, terminals etc. include risk of personal injury or fatal accidents, traffic

incidents and traffic congestion in general. Incidents and congestion create significant problems, especially in the vicinity of border-crossings and terminals.

Based on the goals in hand and key customer needs and problems, we can form an idea what is primarily desired from traffic management services and operations in different sections of the road network. These are compiled in Table 1.

Table 1. Desired effects of various traffic management means in different sections of the road network.

Road Network Sections	Key Desired Effects
Major metropolitan areas	safety, functionality and predictability of travel and transport chains; attractiveness of pedestrian and bicycle traffic; constraining traffic increase
Other metropolitan and urban areas	safety, functionality and predictability of travel and transport chains; attractiveness of pedestrian and bicycle traffic
Key connecting sections of the main roads	safe, reliable, incident-free and predictable travel and transport 24/7
Other main road sections	safe and reliable travel and transport 24/7
Basic network in rural areas	basic safety and reliability of travel and transport
Special sites	ensuring that travel and transport is incident-free and safe 24/7

The aim is to exercise traffic control on all sections of the road network, in order to ensure that road users get information about the allowed speed, guidance to different locations and warnings of local problems.

In addition to the amount of traffic, the greenhouse gas emissions and energy consumption of traffic largely depend on congestion levels. Because most of the adverse effects of traffic congestion in Finland are caused by traffic incidents such as accidents, environmental goals and problems can be addressed by constraining demand for traffic and reducing the traffic congestion caused by traffic accidents and disruptions.

The traffic management services provided by the Finnish Transport Agency and the ELY (the Centres for Economic Development, Transport and the Environment) are determined based on consideration of which traffic management services most effectively yield the desired results in various operational environments. Based on the current impact and feasibility information, Table 2 describes the key means of traffic management in relation to the desired effects.

Table 2. *Key effects sought and the most efficient means of traffic management for achieving them.*

Desired effect	1st means	2nd means
Reduced number of deaths and injuries	Automatic monitoring	Variable traffic control
Basic safety	Safety notifications	Services at rest stops etc.
Compliance with traffic regulations	Automatic monitoring	Variable traffic control
Predictability	Incident management	Safety notifications
Reliability	Incident management	Road use charges
Elimination of incidents	Variable traffic control	Backup routes
Attractiveness of pedestrian and bicycle traffic and public transport	Road use charges	Multimodal route service
Constraining growth in passenger car traffic	Road use charges	Multimodal information service
Combating climate change	Road use charges	Incident management
Travel by the elderly	Driver support	Information services

The traffic management services offered in different sections of the road network, and their quality levels, are described in detail in the background report mentioned in the foreword.

3 Services, Modes of Operation and Roles

3.1 Active Operation of the Traffic Network

In traffic management, the key issue is taking care of traffic i.e. the travel and transport of people and goods. The predictability and reliability of travel and transport in all conditions is the goal of active operation of the traffic network. Minimising and preventing the impacts of incidents play a central role. In active operation, tools include traffic control, traffic information and incident management. Awareness of the real-time status of the transport system is an important operational requirement. The Traffic Management Centre is responsible for the up-to-date operation of the traffic network and traffic management services.

A unified information system including user interfaces will be implemented in the Traffic Management Centre, enabling the on-call person to be continuously aware of the traffic network's status and its predicted development. If necessary, this system will allow an improvement of this status through traffic management.

Real-time, predictive operation of traffic networks also requires the formulation of specific traffic management plans. These plans provide the detailed procedures which must be followed by on-call personnel in road traffic centres and by other operators in order to prevent predictable and unexpected incidents or other problems, or at the latest when such incidents occur. Traffic management plans are drawn up in co-operation with local operators and synchronised with local and regional level incident management plans. The ELY is responsible for co-operation with local and regional operators.

The resources and expertise of the traffic centre are being developed to enable the active operation of the transport system. Traffic network operators regularly practise the management of exceptional traffic situations and incidents and the implementation of traffic management plans.

Key factors in incident management are the development and co-ordination of co-operation between authorities, and the more proactive communication of yet unverified incidents compared to current practices. The Finnish Transport Agency will assume overall responsibility for the co-ordination of road traffic incident management planning. The ELY will draw up traffic and incident management plans for their regions and development work will be carried out on incident resolution. This includes the development of procedures, planning and route signing of backup routes, active use of traffic light directions, acquisition of traffic direction vehicles and vehicles suited to resolving incidents, possible ownership of radio frequencies, and the maintenance of a roadside technology status database. Backup route plans for incidents will be drawn up for the central sections of main roads. These backup route plans will be managed electronically. Incident management is focused on the central main road network and metropolitan areas.

High-quality and effective variable traffic control will be implemented on the busiest main road sections, using consistent principles; this mainly means speed limits which change according to the weather and road conditions. This will occur in the near

future as part of traffic artery projects or as separate projects for individual sections which are especially problematic.

On large roadwork sites with a particularly large impact on traffic, traffic control means will be extensively utilised in order to minimise the roadwork's adverse traffic impact.

For the purposes of active operation of transport systems in metropolitan areas, traffic artery direction based on roadside signage will be developed and traffic light control modernised, including remote control covering all traffic lights, the replacement of hardware and software, traffic light priorities and traffic direction during exceptional situations. Information on traffic incidents and the related route recommendations will be relayed to mass media and producers of information services.

Many services are produced in co-operation with other operators. Co-operation plays an especially significant role in metropolitan areas, where the goal is to produce services covering the entire area's transport system, and regional traffic centre operations in co-operation with road operators, other authorities, transport operators, producers of value-added services and other operators.

For its part, the Finnish Transport Agency will take care of pan-European traffic management services which continue past the nation's borders.

3.2 Ensuring Safe Mobility

The securing of safe mobility is aimed at reducing the number of road fatalities and injuries, enhancing the overall level of safety and security, and improving compliance with traffic rules and regulations. Primary tools include safety related information services, traffic control, enforcement and in-vehicle driver support systems.

The Finnish Transport Agency is responsible for providing free of charge information on the road network's trafficability and safety risks, to all road users.

The safety of local problem points and safety-critical road sections, such as tunnels, is ensured through variable traffic control and other safety systems.

In co-operation with the Police, the Finnish Transport Agency and the ELY will participate in the development and expansion of an automatic speed, traffic light and lane use monitoring system.

Driver support systems will significantly improve travel safety.

Since, by 2020, in-vehicle systems will not become sufficiently prevalent to replace road side signage, such signage must still be used.

3.3 Promoting Public Transport, Pedestrian and Bicycle Traffic

Promoting public transport and pedestrian and bicycle traffic will improve the attractiveness of these modes, restrain growth in car traffic, combat climate change and improve the mobility of e.g. children and the elderly. Primary tools in doing so include demand management means, such as signal priorities for public transport, multimodal travel planning services, high-quality public transport information and, in the future, road use charges.

The Finnish Transport Agency will promote restriction in the growth of motor vehicle traffic and the production of services effectively supporting climate change prevention.

The Finnish Transport Agency will support an investigation into the introduction of road use charges in metropolitan areas and participate in the preparation of road charge related studies and pilot programmes.

In metropolitan areas, the continuity of traffic light priorities and other, similar traffic management services, supporting public transport and pedestrian and bicycle traffic on the road network, will be ensured. The Finnish Transport Agency and the ELY will be responsible for the implementation of real-time public transport information displays on highway network stops located at the continuation of metropolitan public transport corridors and at passenger terminals. They will also participate in the implementation of public transport information intended for park-and-ride facilities.

The Finnish Transport Agency will be responsible for the development and maintenance of a multimodal national route database. Information quality will be improved to cover pedestrian and bicycle traffic and the entire public transport system. The Finnish Transport Agency and the ELY will participate in the development and production of travel planning services for the metropolitan area, promoting sustainable travel.

In many cases, the promotion of pedestrian and bicycle traffic and public transport requires traffic infrastructure improvements in support of traffic management operations; for example, investments and maintenance targeted at lanes, arteries, signage, park-and-ride facilities and stops.

3.4 Real-time Status of the Transport System

High-quality real-time data on the transport system status forms the essential basis of all traffic management services. This data shows both the current and the predicted short-term (15 min – 2 h) status of the transport system, such as incidents, road conditions, traffic flow and travel times. It also includes permanent or slowly changing information on the transport system and its properties (addresses, road numbers, minimum cross section widths, geometry, speed limits, access restrictions etc.).

The quality of the status data has a significant impact on the effectiveness of services utilising it. Active operation of the traffic network and ensuring safe mobility will require a significant improvement in the quality of the status data. The accuracy of travel time information will be improved and short-term forecasts will be generated on central main road sections and the radial and ring roads of major metropolitan areas. Road condition and incident information will also be improved on other, busy main roads. With regard to road condition information, such an improvement will mean the production of so-called road section condition information, i.e. the current condition and a forecast for the next 12 hours, alongside the improvement of the background information for road condition services. Incident information improvements include new incident detection systems and data gathering on incidents which are known in advance.

The Finnish Transport Agency will be responsible for the continuous maintenance, distribution and development of Digiroad, the electronic road network description, and the data of the Digiroad traffic information service. Of the Digiroad data categories important to traffic safety, material servicing PND (personal navigation device) users will be published (e.g. underpass heights, moose warning areas, rest and parking areas).

Basic road network information, route database information and real-time road condition and traffic information will be conveyed free of charge to producers of information services. This principle also applies to information materials purchased from subcontractors, in cases where no market exists in Finland for the information content in question.

The Finnish Transport Agency provides a quality description of its own data warehouses, including variables describing how correct, up-to-date and comprehensive the Agency's information is. For a fixed period on each occasion, the Agency is committed to keeping a data warehouse meeting the quality description available, in accordance with separately described interfaces and charging principles.

3.5 Modes of Operation

Road traffic management services are divided into services for authorities and added-value services. Services for authorities include traffic control, informing road users of trafficability and safety risks on the road network, co-operation between authorities related to traffic incidents, and the related road management support services. The Finnish Transport Agency either produces services for authorities itself or commissions such work from sub-contractors.

Added-value services comprise so-called customised information services. Commercial operators are the primary producers of such services. They finance service production, for example, through usage fees or advertisement income.

If necessary, the Finnish Transport Agency will support the creation of added-value services by participating in the funding of service development, but does not fund the production of established services. The birth of commercial services is also facilitated by the clear specification of free of charge services for authorities. In the future, the Finnish Transport Agency traffic information website (currently www.liikenne-

virasto.fi/alk) will be the Agency's only channel through which road users receive real-time road condition and traffic information. Video feed from road weather cameras will be added to the site as well as text pages which can be used, for example, on mobile phones.

Through these actions, the Finnish Transport Agency will ensure that information related to traffic safety and trafficability reaches the end user. If necessary, the Finnish Transport Agency will participate in the development and production of services supporting civic goals that are not created on market terms.

Agreements shall be made to ensure that traffic information service producers, especially those utilising the Finnish Transport Agency's data warehouses, provide information on the safety or trafficability of the transport system to the Finnish Transport Agency, upon receipt of the information in question.

The national system architecture TelemArk will be complied with in the development and implementation of traffic management. Alongside other operators in the field, the Finnish Transport Agency will be responsible for and participate in funding the maintenance of TelemArk.

The telecommunications infrastructure built to meet the needs of traffic management systems (traffic and demand control) can be made available to other operators, so long as it does not hinder the data security and operational reliability of traffic management systems. Telecommunications networks and connections built during the implementation of new transport system development projects will be designed in order to secure the joint use of the telecommunications infrastructure with other operators. Fees will be charged to cover the costs incurred from using the telecommunications infrastructure.

Tried-and-tested standard solutions are favoured in procurements and purchased services. In extensive pilot programmes and the pre-commercial phase of services, room is made for innovative solutions. Continuous business opportunities are favoured by, for example, purchasing services for a fixed term instead of acquiring ownership of systems.

The Finnish Transport Agency will implement and maintain traffic management service pilots and testing environments in co-operation with the transport authorities and other parties.

The Finnish Transport Agency will monitor the functionality, impact and profitability of traffic management services. It will also be responsible for the acquisition of the required impact assessment information and the application of this information in Finnish conditions.

3.6 Roles and Responsibilities of the Transport Administration

Ministry of Transport and Communications

- 1) Responsible for the steering of traffic management based on the traffic policy.
- 2) Responsible for regulations, as an enabler of wide-scale implementations. This means regulating the roles and responsibilities of different operators, the reasonable pricing of the administrative sector's services and the speedy preparation of temporary legislation and decrees required by wide-scale pilot programmes.
- 3) Formulates public sector strategies for intelligent transport and steers operations in such a manner as to enable the utilisation of all transport system development solutions, including traffic management means.
- 4) Responsible for the prerequisites of intelligent transport, i.e. the acquisition and allocation of government funding in accordance with national strategies and any opportunities for success which arise. This means sufficient resourcing and the selection of investment targets, especially large development projects and programmes.
- 5) Carries out goal-oriented co-operation with different administrative branches in Finland (Ministries of the Interior, the Environment, Finance, Employment and the Economy, Education and Culture, and Social Affairs and Health) leading to concrete actions. The goal is to implement major intelligent transport applications in Finland by eliminating legislative and organisational obstacles.
- 6) Carries out active and goal-oriented co-operation on the international level, with the particular goal of generating new markets and opening them up to Finnish operators.

The Finnish Transport Agency

The Finnish Transport Agency is responsible for the safety, daily trafficability, condition and development of traffic facilities, under uniform principles throughout the country. Traffic management forms part of this task. The Finnish Transport Agency is responsible for the co-ordination of road traffic management and the implementation of services. It also owns road property, including equipment and devices.

The responsibilities of the Finnish Transport Agency are as follows:

- 1) Basic traffic network operating services such as incident management, demand and traffic control, and safety-essential public information services in co-operation with other authorities and the municipalities. These services are intended for authorities and are produced by the Agency itself or commissioned from sub-contractors.

- 2) To provide the basic information infrastructure (status data of the transport system) for services and the service business, including a quality description. This means making the agency's own databases and data warehouses available free of charge to service chain operators over nationally agreed interfaces. The basic information infrastructure covers all modes of transport.
- 3) To fund R&D in the field based on sufficient investment, while bearing responsibility for traffic research and development operations in the field of intelligent transport with respect to areas unfunded by other research funding sources. For its part, the Agency must create and administer major intelligent transport development projects and programmes in co-operation with other participating countries and operators.
- 4) To monitor and develop the functionality of traffic services and road management markets, bear the main responsibility for R&D and know-how development related to the field in question, issue standards and permits related to traffic and traffic facilities, participate in the preparation of the related decrees and act as Finland's representative with respect to the EU and other international co-operation, in accordance with the strategies of the Ministry of Transport and Communication.
- 5) Overall responsibility for the co-ordination of road traffic incident management planning. The entire incident management chain is most effectively operated when there is a clear division of responsibilities. With regard to the safety and smooth operation of the entire transport system, the main responsibility must be borne by a party capable of monitoring the status of the traffic network surrounding the entire incident in real time, and able to intervene if necessary.

Centres for Economic Development, Transport and the Environment (ELY)

The traffic and infrastructure areas of responsibility of the ELY act as regional road management authorities and are responsible for:

- 1) traffic management and the traffic management infrastructure in their areas, in accordance with the agreed strategies, directives and goals
- 2) traffic management as part of transport system planning and project-level planning
- 3) acquisition, upkeep and maintenance of roadside equipment and systems, and of those services which are the responsibility of the units
- 4) co-operation between traffic management authorities and traffic centres in their areas and major metropolitan areas.

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