



Ministry of Transport
and Communications



Towards a new transport policy

Intelligence in Transport and Wisdom in Mobility

Finland's Second
Generation Intelligent
Strategy for Transport



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Finland's Second Generation Intelligent Strategy
for Transport

Ministry of Transport and Communications
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Foreword

Transport is not an end in itself, but a means to an end, enabling other activities to be undertaken and goals to be achieved. In transport policy, the new approach we are following is a challenge, but also a tremendous opportunity. During my time as Minister of Transport, I have become more and more convinced of this.

I strongly believe that development of the transport system must be more innovative and diverse, and must have a stronger focus on the long term. Transport is not there for its own sake, but is an enabler that helps people, businesses and society to reach their goals. Our new transport policy is all about the diversity of means for achieving these goals. Information and communications technology will continue to play a bigger role in people's lives and in future transport solutions.

These ideas are also present in the Government's Transport Policy Report, which aims at modernising our national transport policy. Transport policy is public policy: transport is today more closely linked to the operation of industries, services and the economy, and to employment rates and regional development. The Government Programme also states that "the challenges of public finances, improvement of national

competitiveness, climate policy, changes in the economic structure, and the safeguarding of services all require more efficient and effective means for the development of the transport system".

The Second Generation Intelligent Strategy for Transport is consistent with the new transport policy and unlocks the potential offered by information and communications technology, from the point of view of both the public and private sectors. I hope the strategy will also encourage full-scale exploitation of the potential of information and communications technology in the transport sector and in society at large.

ITS is not just the future; it is here today. I sincerely hope that Finnish society will ambitiously embrace the new possibilities offered by this combination of intelligence and transport.

Helsinki, 30 April 2013

Merja Kyllönen
Minister of Transport



Preface

In autumn 2009, Finland published its Strategy for Intelligent Transport, which was the world's first national ITS strategy covering all modes of transport. The Finnish Government used the strategy as the basis for its resolution adopted in spring 2010, which reaffirmed the objectives and actions outlined in the national ITS strategy. The aim was to closely tie the opportunities and potential inherent in ITS with the Government's transport policy objectives.

The world's first national intelligent transport strategy attracted international attention and received the European Commission's eSafety Forum's Policy Award in Brussels in autumn 2010.

The Intelligent Transport Advisory Board began to update the ITS strategy with the aim of promoting strategy implementation and updating the key projects to the extent required by recent developments in information and communications technology. The updates were drawn up alongside the Transport Policy Report, and once the report had been approved by Parliament, the strategy was refined to better serve the implementation of the transport policy objectives outlined in the report.

This Second Generation Intelligent Strategy for Transport shares the vision, objectives and principles of the previous strategy. Those parts of the key projects that have not already been implemented are also included in the new strategy. New key projects are included which more strongly emphasise aspects such as exploitation of the potential of open data, promotion of ecological mobility, exploitation of the

synergies of electric and intelligent transport, and development of the necessary testing and piloting facilities.

The Second Generation Intelligent Strategy for Transport will continue to integrate ITS into all modes of transport and will make it a key element of customer-oriented transport system operations and the new Finnish transport policy. In accordance with the new transport policy, implementation of the strategy will emphasise cross-administrative cooperation and, in particular, the potential offered by public-private partnerships. In addition to achieving traditional transport policy objectives, we are aiming for significant productivity benefits in various sectors of society and new business opportunities in the booming ITS sector.

We would like to thank the working group, the participants on the Intelligent Transport Advisory Board and all those who contributed comments for their valuable ideas and assistance in drafting this Second Generation Intelligent Strategy for Transport.

Helsinki, 30 April 2013

Harri Pursiainen
Permanent Secretary

Minna Kivimäki
Director-General,
Transport Policy
Department



Summary

Finland's Second Generation Intelligent Strategy for Transport shares the vision, objectives and principles of the Strategy for Intelligent Transport published in 2009.

The implementation of this strategy will be customer-oriented and cross-administrative, and it will especially emphasise cooperation between the public and private sectors. The strategy represents a new way of thinking about transport policy.

The main themes of the Second Generation Intelligent Strategy for Transport are:

- customer-oriented improvement in the level of service for mobility, transport and information services
- furthering the implementation of a new transport policy
- fulfilling the objectives set by the EU's White Paper on Transport and the ITS Directive
- exploiting the opportunities provided by the rapid development of information and communications technology

The promotion of intelligent transport is based on the transport policy objectives and the potential of the ever increasing intelligent transport market. The global intelligent transport market is worth tens of billions of euros and has an annual growth of approx. 20 per cent. It is one of the biggest growth sectors in the world.

The growth in demand for intelligent transport systems and services (ITS) is attributable to factors such as the increase in greenhouse gas emissions, the constant growth in private car use, and the problems associated with ever growing cities and conurbations. With the development of information and communications technology

the potential for using intelligent transport solutions to fix these problems is improving all the time. The most significant technological trends are the massive growth in the number of mobile devices and applications, and the availability of permanent, uninterrupted telecommunications network connections. The release of open data, the increase in location data and navigation services, targeted intelligent content and device independent services are all generating additional growth in the intelligent transport market.

The impact of Finland's Second Generation Intelligent Strategy for Transport will be felt in terms of transport system productivity and efficiency, environment-friendly approaches, safety, customer orientation and ease of use. Safety, efficiency and the environment have long been paramount considerations, but the emphasis placed on each has varied. In our mobile world, usability has become a key factor. The same trend is evident in all sectors that utilise information and communications technology. Within the transport system, user-friendliness consists of a number of factors, the most significant of which are ease of travel, the seamlessness of connections in journey chains for both passengers and goods, and the quality of information services.

To achieve the transport policy objectives, certain key projects must be realised as quickly as possible. As a young industry, the ITS sector has focused on R&D and pilot and test projects. In the future, the focus will shift to the large-scale implementation of tried and tested solutions.

Finland's Second Generation Intelligent Strategy for Transport will be put in place by first implementing the key projects. These are projects that will have a broad impact

on the transport system and across domains relevant to other administrative branches of government. An improvement in socio-economic efficiency is also high on the list of objectives.

The strategy's implementation programme includes the following key projects:

1. Intelligent transport system reference architecture
2. Real-time situation picture of transport system status and operation
3. Integrated public transport system
4. Intelligent traffic control
5. Reactive and proactive safety systems
6. Multi-service model for transport
7. Intelligent logistics
8. Smarter and more eco-friendly mobility
9. Innovation and piloting programmes for intelligent transport

This list of key projects is based on the Strategy for Intelligent Transport published in 2009. It has been supplemented to better meet the needs identified during the past three years and the policies outlined in the EU's 2010 ITS Directive.

The objectives, content, extent and duration of the key projects vary greatly, but they will all assist in achieving more than one objective defined in the strategy.

The implementation of the strategy calls for commitment and cooperation from all participants. All the projects are primarily joint projects between the public and private sectors. The public sector acts as transport policy maker and enabler, while the private sector acts as executor and commercialiser.

Funding for the projects will come from a variety of sources. It will involve all transport sector stakeholders, though the

Government's transport administration will be principally responsible for the funding. Strategy implementation does nevertheless call for financing from other stakeholders besides the State – such as businesses, local government, the Finnish Funding Agency for Technology and Innovation (TEKES) and end users.

The strategy will gradually put into practice the EU White Paper's "user pays" and "polluter pays" principles.

It is difficult to clearly separate the annual budget for implementing the Second Generation Intelligent Strategy for Transport from the funding for other associated activities. The annual budget is nevertheless estimated to be approx. EUR 40–60 million. All projects will be realised within the budgetary framework. The key projects will cost a total of approx. EUR 300 million in 2013–2017, and this will be covered by the different stakeholders as follows:

- EUR 215 million from central government
- EUR 20 million from municipalities
- EUR 30 million from businesses
- EUR 35 million from users

Finland already has top-level expertise in all key areas of the ITS sector. Finnish businesses therefore have the potential to garner their share of the booming international intelligent transport market and create new business, enterprises and jobs.

Implementation the projects in the Second Generation Intelligent Strategy for Transport will enable further development of the ITS sector in Finland, and will assist in attaining national transport and economic policy goals.



1. Frame of reference

“New technologies for vehicles and traffic management will be key to lower transport emissions in the EU as in the rest of the world. The race for sustainable mobility is a global one. Delayed action and timid introduction of new technologies could condemn the EU transport industry to irreversible decline. The EU’s transport sector faces growing competition in fast developing world transport markets.”

European Commission’s White Paper 2011

The frame of reference of Finland’s Second Generation Intelligent Strategy for Transport is largely based on European and national transport policy objectives and global ITS trends and technologies. The development trends of industries indirectly associated with ITS, such as the automotive industry and the information and communications industry, add their own challenges and opportunities to all national implementations.

1.1 Updating the Strategy for Intelligent Transport

Finland’s Strategy for Intelligent Transport was completed in autumn 2009, and was the world’s first multimodal national ITS strategy. It established intelligent transport as a key issue, and played a part in promoting transport policy reform to better respond to the challenges of the ensuing decade.

The 2009 strategy defined the vision, principles and objectives of ITS for 2020 and outlined the areas of emphasis and their key projects. It also defined the roles and financial responsibilities of the different stakeholders and outlined a concrete implementation programme complete with responsible parties and timetables. A national Intelligent

Transport Advisory Board was established to promote and monitor the implementation of the strategy. The eight key projects defined in the strategy are all currently under way. Some of them are in their early stages, while others are already nearing completion.

The Intelligent Transport Advisory Board began the task of updating the national ITS strategy in 2011 in accordance with the Government Programme. The Programme called for the cross-administrative promotion of intelligent solutions that utilise information and communications technology in all sectors of society. Each Ministry was to draw up an intelligent solutions strategy complete with objectives and steering mechanisms at the start of the Government’s term of office. The strategy update led to the creation of the Second Generation Intelligent Strategy for Transport, which was given the title “Intelligence in Transport and Wisdom in Mobility”. This focuses on increasing the efficiency of implementation and on supplementing the action plan.

The Second Generation Intelligent Strategy for Transport was compiled under the supervision of the Ministry of Transport and Communications in a working group, which included representatives of the Finnish Transport Agency, the Finnish Transport Safety Agency (TraFi), the Finnish Meteorological Institute, the City of Helsinki and, representing businesses, ITS Finland and Nokia Plc. The strategy was initially prepared alongside the Transport Policy Report. After the report was approved by Parliament, the central points of the strategy were refined to support the aims of the new transport policy. Major urban area authorities and business representatives were provided with the opportunity to express their views during the process. The content of the updated strategy and the progress of the key



projects, in particular, were discussed at all advisory board meetings and working groups. Around 500 individuals and organisations were invited to comment on a draft of the strategy. A total of some 70 responses were received. All the comments were reviewed and taken into consideration as the strategy was finalised.

1.2 New transport policy

The Government Programme emphasises the comprehensive, cross-administrative integration of transport policy into the frame of reference of business, the economy, employment and regional development. In a sustainable, user-centred post-industrial society, infrastructure, mobility and logistics are seen as a service and as a source of growth, competitiveness and wellbeing.

Finland's main transport policy objectives are ensuring the smooth flow and safety of passenger and goods transport, achieving the emission goals and improving the efficiency and effectiveness of the transport system. It would be difficult to attain all these goals by means of the available resources using traditional transport system development methods, which focus on infrastructure investments. A new kind of

thinking and a new kind of transport policy are needed.

In this new approach, levels of service can usually no longer be improved by doing more, but by doing things in a smarter way. We need more courage to question existing procedures and methods, and more interest in creating new solutions for increasingly complicated, cross-administrative problems. The Government's transport administration must place more emphasis on innovative solutions and exploit all the potential provided by information and communications technology with the aim of creating an intelligent transport system.

The new thinking is based on the Government Programme and takes concrete shape in the Transport Policy Report approved in April 2012. A key point is the creation of a transport system centred on the level of service. In this system, a public sector client defines the level of service required, and service providers are given greater freedom to meet these requirements through the technological means of their choosing. In the future, all levels of the transport administration will reflect this change in thinking. This new approach will be promoted by the New Transport Policy Forum, which took over the duties of the Intelligent Transport Advisory Board when its

term ended at the end of 2012. Intelligent transport will be integrated into the new transport policy and become a natural part of transport system development.

1.3 European Union and intelligent transport

The European Commission's main transport policy statement, the 2011 White Paper on Transport (entitled "Roadmap to a Single European Transport Area – Towards a Competitive and Resource Efficient Transport System") emphasises the importance of a competitive and resource-efficient transport system. It states that transport must consume less energy, use clean energy and efficiently exploit multimodal, interconnected intelligent transport networks, but without having to restrict mobility. This means the creation of a unified transport area consisting of the main transport networks (TENs), the creation of interoperable traffic control systems, and reform of passenger and goods transport pricing to incorporate the principle of full cost recovery.

The key EU documents for intelligent transport are currently the ITS Action Plan and the ITS Directive (2010/40/EU), which supports implementation of the Action Plan. The main part of the ITS Directive, which came into force in August 2010, is the specification of priority actions defined by the EU Commission. These specifications aim to ensure the interoperability and continuity of services and systems both regionally and across borders. They also aim to ensure the availability and sufficient quality of the transport information needed for these services. A Europe-wide market area is also established for transport services and equipment.

The first specifications, concerning the automated in-vehicle emergency call system (eCall) and freely-available transport information considered vital for safety, were completed in early 2013. In the coming years, information and booking services for intelligent truck parking, real-time traffic bulletins and multimodal passenger information will also be specified. If the Commission's specifications are approved by the Parliament and Council of the European Union, they will have to be adhered to

when implementing ITS services. However, each Member State is able to decide which services it will introduce and when.

It is important that Finnish views are represented in the European ITS Committee, which supervises the implementation of the ITS Action Plan and ITS Directive. Finland must also be an active participant in international standardisation committees as well as expert workshops and conferences when specifications for priority actions are being drafted and finalised.

A number of other EU initiatives and actions closely connected with ITS are also under way. These include Innovation Union, which promotes European competitiveness and economic growth, the Digital Agenda for Europe, which promotes the exploitation of information networks, and Smart Cities, which aims to solve the increasing traffic-related and other problems in urban areas. All of these projects hope to speed up European innovations and see large-scale joint European projects and test areas as a means of making this happen.

Steered by the European Commission Directorate General for Communications Networks, Content and Technology (DG CONNECT), the iMobility Forum, often working together with industry, aims to speed up the implementation of safe, intelligent and clean road traffic services. The Directorate General for Mobility and Transport (DG MOVE) on the other hand promotes and facilitates the implementation of ITS on trans-European transport networks through the Connecting Europe Facility (now TEN-T) programme.

The significant reduction in national funding for transport research has increased the importance of EU research programmes, and their role in guiding national developments. The most significant element of the Horizon 2020 Programme starting in 2014 in terms of research and development on ITS is probably the Smart, Green Integrated Transport Programme set up under the heading "Societal challenges". The TEN-T Programme also contains a lot of funding opportunities for ITS.

The EU's own satellite system, GALILEO, will begin offering its initial services in 2014 and will provide a reliable foundation for future services. GALILEO will be fully operational by 2020.

Key EU policies:

- Implementation of the ITS Directive and ITS Action Plan demands that Finland directly link its national transport R&D to the EU's R&D priorities and that national action plans be drawn up for the priority areas and actions outlined in the Directive. The flexibility and level of innovation of national R&D operations and continued cooperation with Russia must also be ensured.
- Other transport modes besides road traffic should also have national implementation plans drawn up on the basis of EU-wide transport management systems (SESAR for aviation, ERTMS for railways, SafeSeaNet for shipping).
- A national plan should be created for ensuring that passenger and goods transport pricing is based on the principle of full cost recovery.

1.4 Intelligent transport and megatrends

ITS does not exist in isolation but is greatly affected by global trends and macroeconomics. These have contributed significantly to the growing demand for ITS solutions and the development of ITS services.

The biggest global trend of the 21st century will be **the growing emphasis on environmental issues**. Transport, in particular, will be affected by climate change and the scarcity of natural resources. Traffic emissions already have a huge impact on climate change. In 2012, 25 per cent of all greenhouse gas emissions in Europe were caused by transport, making it the second biggest source of greenhouse gas emissions. Of significance from an ITS point of view, a considerable proportion of vehicle emissions is produced during inefficient driving, for instance driving around looking for a parking space. Greenhouse gas emissions must be significantly reduced during the next few decades. The EU's goal of cleaner, more energy efficient transport will play a key role in influencing national actions, which will include ITS-based solutions.

In the world's most developed countries, a major challenge is **the ageing of the population**. This trend also affects the

way transport systems must be developed. As the population ages, vehicle technology, transport services and transport safety must adapt to people's changing needs.

One of the most significant trends in terms of its impact on the transport system and national economy is **urbanisation**, and the effects of this are similar all over the world. Growing mobility needs can be catered to by creating an intelligent transport system incorporating a sufficient public transport network supported by intelligent feeder traffic and parking solutions.

In recent decades, escalating car use has seemed inevitable. However, developments in online communications (virtual presence capabilities) and information services, urbanisation and improvements in public transport services have led to a growing global trend in which young adults **no longer feel the need to get a driving licence or to own a car** the way earlier generations did. Evidence for this trend can be seen in the decrease in new car registrations in Europe. While it is true that new vehicle registrations have a strong correlation with general economic trends, young people's driving licence acquisitions do not have this same correlation.

Although these trends will by no means eliminate private car use, they are likely to mean a change in car use. Thus, one future transport and mobility trend will be the more significant role played by mobility services. European vehicle manufacturers plan to offer solutions in which manufacturers will provide not just a vehicle, but a total mobility service package with integrated public transport services. The SaaS concept (Software as a Service) known from information technology and cloud services will be developed in the transport sector as the TaaS concept (Traffic as a Service).

The most significant technology trends for transport are the boom in mobile devices and applications, persistent network connections (always online), the opportunities provided by 'big data', the release of open data, the increase in location data and navigation services, targeted intelligent content and device independent services. These are all part of the ubiquitous information society, towards which we are inevitably moving, and are all visible in transport services.

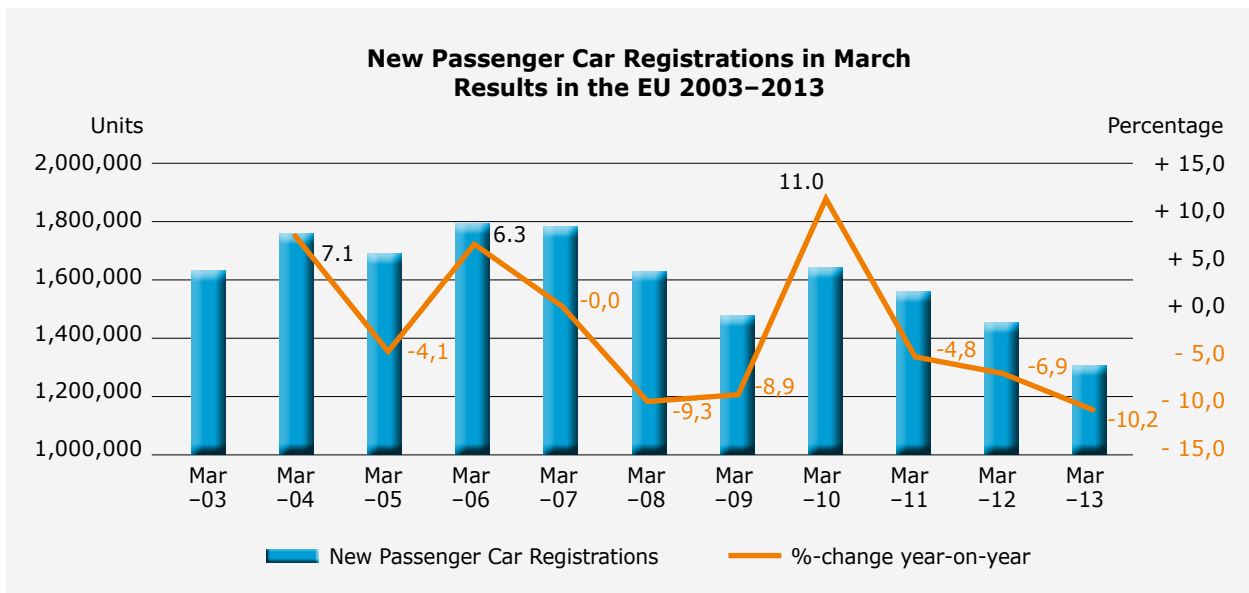


Figure 1. New passenger car registrations in Europe. European Automotive Manufacturers Association (ACEA)

The above trends create opportunities for new business, services and operators. Finland and Finnish companies are in an excellent position to create new business, enterprises and jobs in ITS. Finland is a relatively small country where it is easy for companies to innovate and try out new applications and services. This requires investment, cooperation between the public and private sectors, test platforms and environments, and funding – i.e. an operating environment that encourages innovation.

1.5 Intelligent transport market – volume and challenges

1.5.1 Market volume

Growth in the intelligent transport market has a direct correlation with increasing traffic volumes and the problems this causes. Significant growth has already occurred in the global intelligent transport market. Depending on the market estimates and content definitions used, the total ITS market volume is estimated to be around EUR 20–50 billion, with an annual growth of around 20 per cent (BCC Research (2010) Intelligent Transport Systems Review.)

The Finnish ITS market volume for 2010 was estimated at EUR 300 million, and the number of jobs in the field at 1,700. The

market is growing at a distinctly slower rate in Finland than it is internationally, but it is still outpacing economic growth in general (Suomen ITS –markkinat [“Finnish ITS Markets”], Leviäkangas, Zulkarnain, Roine, VTT 2012).

The global ITS market is already significant, and its growth outlook makes it very attractive for Finland and Finnish companies. We are traditionally very competitive in fields requiring high-level expertise, and our expertise in the mobile industry has been especially strong at an international level. Our economy and society are currently under considerable pressure to change and adapt, and this is exacerbated by the economic crisis, the prospect of a prolonged period of slow economic growth and the ongoing industrial restructuring. In the future, the ITS sector together with the electric vehicle industry will offer significant potential for talented, active stakeholders.

1.5.2 Market challenges

ITS is a relatively young sector, and its market, products and services are currently undergoing a phase of rapid growth and development. Nevertheless, companies that develop and produce ITS services face plenty of challenges associated with the operating environment, operating models and new technology. These challenges should be



solved through PPP. The known challenges include:

1. Finland is a limited market, and so the limited demand means that services designed for a large number of users cannot be properly developed, as domestic demand will not cover the development and production costs. Small and medium-sized enterprises also have little or no access to export channels. SMEs may cooperate with major companies to break into the export market, but this presents its own set of challenges, such as the issue of intellectual property rights.
2. ITS standardisation is only in its early stages. This presents challenges especially for the development of services and products intended for the global market. For this reason, governments should at the very least promote the drawing up and exploitation of open interface descriptions. Businesses would also benefit if national authorities take an active role in the functioning of standardisation organisations, such as CEN and ISO TC204, and research cooperation organisations, such as COST.
3. The division of intelligent transport services into free public services and market-based services still lacks clarity.
4. Businesses are concerned that the public sector may distort the market by offering services free of charge and thus possibly hindering the development of private sector services. Genuine public-private partnership is only possible if clear rules are established for the provision of public and private services.
5. User interfaces that allow drivers to utilise ITS services in moving vehicles are still primitive in terms of transport safety. Reading an elk warning off of a small mobile phone display may cause more accidents than the physical presence of elks on the road. Therefore, solutions should be developed to allow information from a smart phone to be accessed more safely, for instance through the vehicle's larger console display or speakers. Terminals that are suitable from a transport safety perspective currently hold a very small share of the market, but will hopefully grow rapidly in popularity. This would encourage the production of more services for these devices and also reduce unit prices.
5. Travellers produce a large variety of data with their vehicles and mobile devices. This data could be exploited in the production of new services, and should therefore be open and available to all service providers.



2. Intelligent transport system

"The Government will submit a Government report to outline medium-term transport policy projects and reserve funding for the projects mentioned in the report. Important projects include plans serving large volumes of traffic that also support economic growth, have the best cost-efficiency rates, promote traffic safety, reduce emissions, and are of regional importance. Intelligent transport systems will support the development of transport efficiency. The introduction of GPS-based road user charges will be examined. A national public transport ticketing system will be introduced, facilitating travel on any public transport vehicle with a single travel card. A national schedule and route service for public transport will be implemented."

June 22, 2011, Programme of Prime Minister Jyrki Katainen's Government

Intelligent transport systems are founded on a simple basic principle: the use of information and communications technology to improve the functioning of the transport system. In practice, this mainly involves the wide-ranging use of information and payment systems. Information and communications technology and pricing arrangements can be effective in guiding personal choices and the development of the entire transport system in the desired direction. At the same time, travellers can be steered towards smooth, safe, economical and environmentally friendly travel habits. The need to make a journey can even be eliminated by the use of virtual presence technology.

The transport system of the future will be intelligent. Substantial private sector investment in intelligent vehicle systems, navigation systems, mobile devices and intelligent transport and mobility services will inevitably ensure that further development

continues to occur. The public sector is responsible for ensuring that transport policy objectives are taken into account, for developing and implementing services that cover the entire transport system, and for providing services to groups that are not covered by commercial services.

2.1 Vision for intelligent transport

Intelligent transport will form an integral part of the transport system and will play a key role in the realisation of the national transport policy objectives. 'Transport Vision 2030+' was outlined in conjunction with the drafting of the Transport Policy Report and forms a natural backdrop to the vision for intelligent transport.

The intelligent transport system will be an integral part of the ubiquitous information society and people's everyday lives. Intelligent transport networks and services, intelligent vehicles and well-informed travellers will together form an integrated system. Travellers will be able to easily access transport system status information at any time and any place. The intelligent transport system will suggest alternative routes and transport modes, taking into consideration the traveller's personal needs and preferences as well as environmental sustainability.

Vision for ITS

- Intelligent transport policy will produce efficient solutions to meet customers' mobility and transport needs. By 2020, Finland will have one of the world's most advanced and efficient transport systems.
- Real-time transport system operations will provide a continuous stream of information concerning travel, transport

and the conditions affecting them. This will allow people to better plan and predict their movements and allow information and help to be received quickly in the event of an incident. Transport services and traffic control will be based on the world's best real-time transport network status technology.

- In an intelligent transport system, each traveller will produce and use transport system status information in a variety of ways. The principle is that informed travellers will be satisfied travellers. Transport infrastructure and services will be used significantly more efficiently in such a system.
- ITS will allow route capacity to be used more efficiently and will increase the productivity of the entire infrastructure sector. Cost-effective logistics will improve Finnish competitiveness.
- Finnish businesses will produce innovations that are subsequently developed into successful ITS exports.
- A demanding public client and active, responsible users will remain the prerequisites for innovations and long-term service development, benefitting all.
- ITS will increase the efficiency and safety of transport and makes it more environmentally friendly.

2.2 Principles of intelligent transport

Intelligent transport observes the following principles or values:

- I. **Intelligent transport should represent sustainable development.** Transport services and products should favour socially, economically and ecologically sustainable solutions. Through

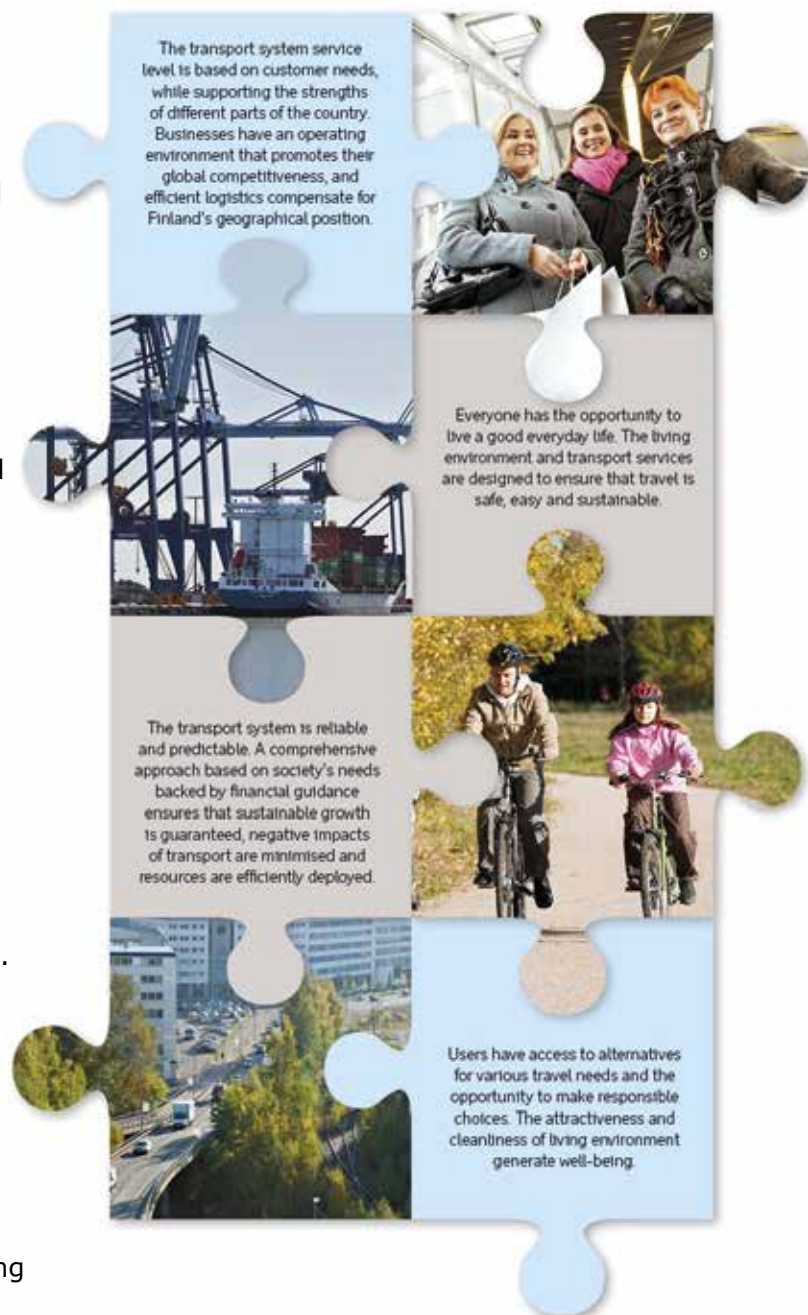


Figure 2. Transport Vision 2030+. Transport Policy Report (4/2012)



successful everyday travel and transport, ITS will provide sustainable well-being and economic growth for Finland.

II. ITS should treat all people, businesses and regions equally.

Both the private and public sector will provide intelligent transport services. When providing services, the special needs of all population groups, including the needs of older people and “accessibility for all” must be taken into consideration.

Different modes of travel and transport are accepted, and the public sector will not distort healthy market competition. A transport policy that makes use of intelligent transport systems will treat all transport modes and service providers equally, unless there are significant social reasons to do otherwise. Transport policy will aim to offer a high level of service for passenger and goods transport.

III. Intelligent transport should be easy and inexpensive to use.

Information and communication are not ends in themselves, but a means to achieve concrete benefits. Services should be designed and implemented to be customer-friendly, not technology-oriented. Service prices must be kept low by a competitive market supported by well-planned and well-supervised laws

and regulations. Intelligent transport services must also be beneficial for the national economy.

IV. Intelligent transport systems should respect the privacy of citizens.

Intelligent transport service providers must ensure their customers’ privacy. They are required to do so by law, and are assisted in their efforts by various guidelines. Sufficient data security will ensure that the property and safety of people or businesses are not significantly endangered.

V. ITS should be founded on solutions familiar to consumers.

Intelligent transport services should ideally be provided using the existing services and service platforms, such as mobile phones and other nomadic devices, positioning devices or other information systems. The construction of separate systems specifically for the needs of transport should be avoided.

VI. Intelligent transport services should be nationwide and internationally compatible.

It is in the interests of intelligent transport service users that services are interoperable nationwide. Due to prevailing conditions and user needs, some services may only be regional or vary from place to place. International compatibility will be paramount, especially in the field of logistics.

VII. Intelligent transport systems should be created in a cooperative network consisting of the public and private sectors and service users.

The providers of transport and ICT networks and services should commit themselves to acting in the interests of the national strategy objectives and in cooperation with each other. Intelligent transport system users should be brought into open cooperation with service providers. A key trend will be the increasing public sector investment in information production and service support systems that make market-based services possible.

3. Objectives and emphases of an intelligent transport system



The objectives and emphases of the intelligent transport strategy are based on the fundamental issues that the new transport policy seeks to influence. The new transport policy takes a customer-oriented view of the entire transport system. Intelligent transport solutions and services will play a key role in the implementation of the new transport policy.

3.1 Intelligent solutions for transport: strategy objectives for 2020

The strategy objectives regarding the intelligent solutions for transport are based on those outlined in 2009. With the Government's new transport policy in place and supported by ITS, the Finnish transport system will achieve the following results by 2020 (figures in comparison with 2009):

Efficiency objectives 2020

- The productivity of infrastructure management and the transport system will have increased by 10 per cent more than the increase in general productivity.
- Due to an increase in the efficiency of transport chains and terminal logistics, private sector logistics costs will have been reduced to a level almost on a par with those of our main international competitors.
- Commuter traffic delays caused by congestion will have been reduced by 20 per cent in large urban areas.

Safety objectives 2020

- ITS will help save 50 lives annually in road transport, and no lives will be lost in commercial maritime, air and rail transport.

Environmental objectives 2020

- Greenhouse gas emissions caused by transport will have been reduced significantly. The growth in final energy consumption will have been halted.
- Public transport, cyclists and pedestrians will make up a 20 per cent larger share of all trips than they do now.

User comfort objectives 2020

- Customers will be satisfied with the smooth operation of the transport system and will be kept well-informed at all stages of travel (a minimum of 80 per cent satisfied customers).

Joint implementation objectives 2020

- Finland will be one of the five most advanced nations in the world as far as the use of intelligent transport services and products is concerned.
- Finland will produce and export a significant amount of intelligent transport services and products.

3.2 Focus areas in the Intelligent Strategy for Transport

Transport system productivity and efficiency, environmental friendliness and safety have long been paramount considerations, but the emphasis placed on each has varied. Customer orientation and ease of use are also key factors, but have so far been of lesser importance. In our mobile world, usability has become a key element too. The same trend is evident in all sectors that utilise information and communications technology. Within the transport system, customer orientation and ease of use consist of a number of factors, the most significant of which are ease of travel, the seamlessness

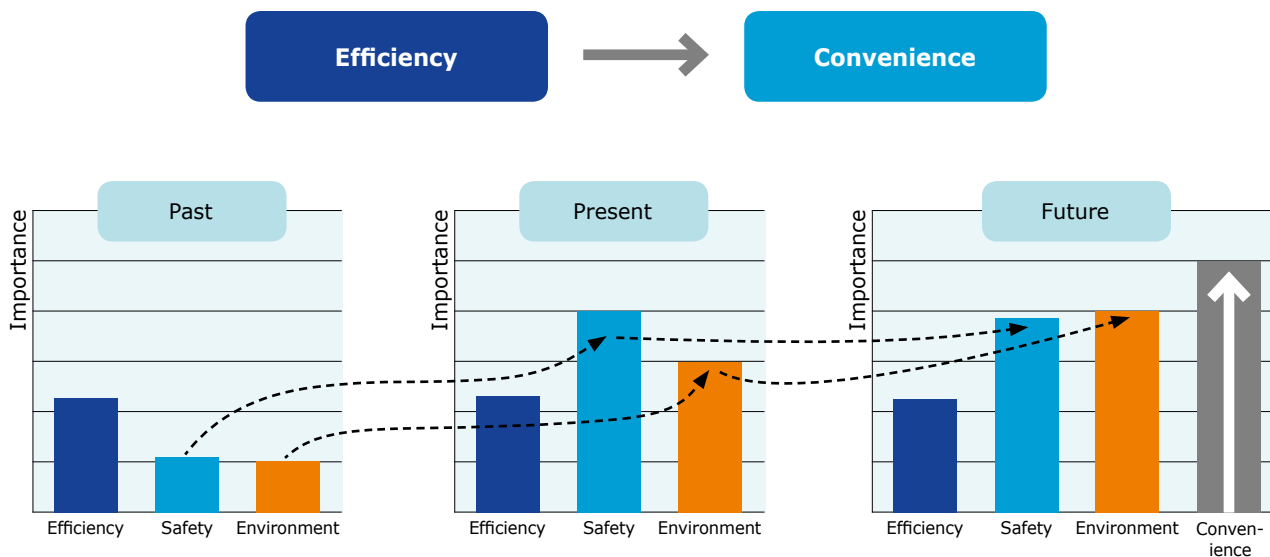


Figure 3. The future of ITS. (The Paradigm Shift in ITS. Mr. Chullho Lieu, Chairman of ITS Korea.)

of connections in journey chains for both passengers and goods, and the quality of information services.

In addition to specification of these transport policy areas, another key element of the strategy is acceleration of the implementation rate. As a relatively young industry, the intelligent transport sector has previously focused on R&D and pilot and test projects. In the future, the focus will be gradually shifted to the large-scale implementation of tried and tested solutions.

3.2.1 Efficiency

A high level of efficiency and productivity in the transport system will primarily be attributable to a well-functioning infrastructure and the availability and use of real-time data. A smooth, incident-free, multimodal transport and information network means seamless trip chains, predictable delivery timetables and efficient logistics.

Prompt and efficiently scheduled goods transport will require real-time data on the status of traffic and environmental conditions and forecasts of these. The benefits of real-time predictable transport information will be most clearly visible at logistics nodes, such as terminals, ports and border-crossing points. Further development of the electronic processing of transportation and

customs documents and of automatic freight and transport equipment identification will increase the efficiency of the entire delivery chain. Deliveries could be combined by making use of electronic data on transport needs and service availability. This in turn will improve loading ratios and cut down on kilometres driven, resource requirements and traffic emissions. Intelligent transport solutions will allow us to take traditional Just-On-Time thinking a step further and thus minimise or even eliminate logistics chain inefficiencies. Precise vehicle positioning by utilising the national FinnRef network will support the creation of new, even more precise ITS applications.

As the various mode-specific transport guidance systems are renewed, transport efficiency will be lifted to a new level, because it will be possible to safely accommodate more passengers and goods on a given road, rail or shipping network. This is a cost-effective way of increasing the capacity of the existing transport infrastructure.

3.2.2 Safety

In accordance with Finland's transport safety vision, the transport system will be planned and designed in such a way that no-one is killed or seriously injured in traffic accidents. The aim for the period up to 2025 is to constantly develop the transport network

so that the annual road traffic fatalities number 100 at most, and in other modes of transport there would be no traffic fatalities. The EU White Paper sets the goal of cutting traffic fatalities by half by the year 2020, and virtually eliminating them by 2050. In practice, these objectives cannot be reached without intelligent transport systems.

Road traffic safety issues can be narrowed down to four basic factors:

- excessive speed
- poor driver condition (alcohol, drugs, fatigue etc.)
- non-use of safety equipment (seat belt, car seat, helmet)
- human limitations and miscalculations

Of these four, driving speed is the one factor that always affects the severity of bodily and other injuries. The most effective ways of reducing road traffic fatalities are by reducing driving speeds, limiting driving while impaired and monitoring the use of in-vehicle safety equipment. Systems that support and guide driver behaviour can prevent or reduce the severity of accidents. Automated speed surveillance cameras are an effective safety tool. The benefit of these cameras can be even greater if they are used and approved widely by municipal authorities.

As data exchange between vehicles and the transport infrastructure increases in the future, it will also be possible to relay information among travellers, and drivers can be given warnings and guidance to make the right choices. The use of intelligent solutions to influence driving habits can have an impact on safety and on eco-friendly driving habits. In the future, the European emergency call system (eCall) will also help to improve transport safety. Finland aims to be one of the first countries to introduce the service.

The fourth safety issue referred to above is concerned with dangerous situations caused by human error and poor judgement on the part of drivers and other transport network users. Intelligent transport solutions and intelligent vehicle technology may significantly improve transport safety by helping travellers avoid such errors and by reducing the impacts of these errors. Speeding is primarily about driving too fast for the given situation, but "slow speeds" can also be fatal in the wrong place and time.

Intelligent transport and vehicle solutions have the potential to significantly improve transport safety.

The increasing amount of maritime traffic in the Baltic Sea and changes in the operating environment are the greatest challenges facing the safety of maritime transport. Measures to promote intelligent maritime transport will include producing information for vessels on the status of the fairway network, for example.

By developing and renewing monitoring and guidance systems, accident risks can be identified and accidents can be prevented on land, at sea and in the air. As monitoring systems for the transport of dangerous goods become more advanced, emergency services will have access to real-time location and cargo information on any transport vehicle involved in an accident.

Safe transport systems require expertise in planning and design, and the use of time and location data for passenger and goods traffic. By using a range of fixed and mobile sensors, a tremendous amount of high-quality data can be produced for use in transport planning. This data will help eliminate risks and danger spots all across the transport system.

Transport safety is a major issue within the EU and internationally, and it is essential that Finland plays an active role in the debate and development work on transport safety issues.

3.2.3 Environment

The main challenge facing transport policy in the current decade is the need to radically reduce greenhouse gas emissions caused by transport. This can be achieved in part by introducing new vehicle technology and increasing the use of renewable energy. ITS can also be used to make transport management more efficient and to encourage people to use more sustainable modes of transport and to make more responsible decisions. The aim is to challenge the status of private car use as the most popular mode of transport in large urban areas by increasing and improving the level of service of public transport, walking and cycling, and by introducing intelligent services associated with these transport modes.

Mobility management aims to influence travel habits and encourage the use of



sustainable modes of transport. It covers a wide range of methods from the promotion of working at home to measures to create a greater level of integration and cohesion in regional and urban structures. ITS information resources can be used to support the planning of communities and the coordination of transport and land use. These resources will also enable the production of information services that promote smart daily mobility choices. Teleworking, distance learning, teleshopping, mobile telework, social media and video conferencing are all available to Finns already. Even though these activities traditionally fall outside the scope of transport policy, their increasing popularity will help in achieving almost all transport, environmental and climate policy objectives.

Transport pricing systems can be used very effectively to promote fulfilment of the transport policy objectives. Intelligent and fair pricing based on time, place and driving behaviour can help reduce congestion, shorten travel times, improve transport

safety and reduce transport emissions. The same multipurpose systems can also be used to enable other transport and payment functions, such as insurance payments, driver's logs, monitoring of driving behaviour, travel expense reports, and even a new type of vehicle taxation.

3.2.4 Ease of use

In a customer-oriented transport system, the traffic environment and the services available, including information services, will work well for all travellers, including those who are least advantaged. This means accessibility for all, ease to use, information provision through multiple channels, and seamless door-to-door trip chains. Unimpeded travel and communication will reduce costs in other sectors and prevent social exclusion.

Public transport passengers already have access to a wide range of route and timetable information, and private car drivers can already use portable and in-vehicle

terminals to access real-time information on congestion, road surface conditions and the weather. Efficient management of disruptions and incidents reduces the detrimental consequences of these and also improves the operational reliability of the logistics chain.

Efficient cooperation between public authorities together with real-time information exchange will help to quickly restore normal operation after any disruption or incident, laying the foundation for reliable commercial navigation, information and guidance services. Stakeholders must cooperate to ensure and promote ease of use by providing the prerequisites and resources needed for carrying out extensive user testing and trials.

The end result will be a comfortable, reliable, safe and stress-free system that guides and proactively assists travellers. Service providers consider ease of use an essential part of their product and service development, and it is also increasingly a key factor in maintaining competitiveness.

3.2.5 Joint implementation

A key aim of the new Second Generation Intelligent Strategy for Transport is to further the implementation of the 2009 Strategy for Intelligent Transport. The ITS industry is characterised by a close, almost symbiotic, working relationship between the public and private sectors. Cooperation is aided by the fact that both sectors wish to see the transport policy objectives reached. The public sector in Finland has systematically reduced its own service production, and an increasing number of public services are instead provided by private companies. The public sector creates the conditions and the opportunities, while the private sector produces services on the basis of this. ITS companies provide services not only for the public sector, but for other companies and, increasingly, directly for consumers.

Around the world, ITS services and applications are considered one of this decade's most promising markets. The collection, combination and processing of digital information creates new operating models for services, and this in turn creates new business. The raw data needed in ITS service provision is produced by consumers, companies and the public sector and stored

in a variety of databases. The Government Programme states that "Information resources produced using public funding will be opened up for public and corporate access. The goal is to make digital data materials managed by the public sector available to citizens, companies, enterprises and organisations, authorities, and for research and education purposes in an easily reusable format via information networks." The big challenge for open data production chains are the contract terms regulating data redistribution, which may limit users' rights to edit the data or to share it with a third party. Open availability of public information resources must be ensured in order to encourage business activity and create a more functional market for ITS products and services. Clear and unambiguous terms of use must be defined for the distribution of public open data.

Raising Finland to the status of a leading global developer and user of intelligent transport solutions is important not only for achieving the Government's transport objectives but also for its industrial policy goals. Exports are essential for the wellbeing of Finland and its citizens. If indirect impacts are included, exports are responsible for around 50 per cent of the country's GDP.

The utilisation of intelligent transport solutions is a rapidly growing global industry with considerable export potential. Finland possesses world-class expertise in information and communications technology and in intelligent transport solutions. By promoting the development and growth of the Finnish ITS sector, we can improve the service level of that sector in Finland and create export products for the international market.

By providing commercial operators with information about public sector policy outlines and future procurements openly and in advance, these operators will have time to prepare for the future and reduce the risks associated with service and product development. It will also enable the introduction of new innovative products and services for the market and for the use of travellers. By aiding the development and growth of the domestic ITS sector, the sector's level of service in Finland will be improved, and it will be possible to establish sustainable business activities and the prerequisites for globalisation.

4. Implementation of the Second Generation Intelligent Strategy for Transport



Finland's Second Generation Intelligent Strategy for Transport will be implemented via the strategy's key projects. The project framework was outlined in the 2009 Strategy for Intelligent Transport. The framework has been supplemented in order to meet the objectives of the EU's ITS Action Plan and ITS Directive and the new requirements identified during the strategy updating process.

The key projects must be socio-economically efficient and must have a beneficial impact on the transport system. In practice, each key project promotes the realisation of more than one transport policy objective. The following table represents an

expert assessment in broad terms of the extent and nature of the impact of all of the key projects.

4.1 Intelligent transport system reference architecture

According to the definition in the EU's ITS Directive, 'architecture' refers here to a model specification setting out a system's structure and functions and its connections with the operating environment. This architecture will help the Government's transport administration to manage the strategy

Table 1. Impact of ITS strategy's key projects

	Efficiency of transport system	Eco-friendliness	Safety	Customer-orientation and ease of use	Implementation cooperation
Intelligent transport system reference architecture	++	0	+	+	+++
Real-time situation picture of transport system status and operation	+++	++	++	++	++
Integrated public transport system	++	+++	+	++	+
Intelligent traffic control	+	+	+++	+	++
Reactive and proactive safety systems	+	0	+++	++	++
Multi-service model for transport	++	+	+	+++	+++
Intelligent logistics	+++	+	+	+	++
Smarter and more eco-friendly mobility	++	+++	+	++	++
Innovation and piloting programmes for intelligent transport	++	+	+	++	+++

Table 2. Intelligent transport system reference architecture projects

Main actions	Coordinator + participants	Timetable
Organise and allocate resources for influencing and participating in ITS sector standardisation.	MinTC FTA, TraFi, ITS Factory	2013–2015
Draw up an upper-level intelligent transport reference architecture.	FTA MinTC, TraFi, ITS Finland, municipal sector, corporate sector	2013–2015
Update the transport information architecture and national KALKATI.net interface library to fit current and future ITS needs. Establish a host organisation for the updated intelligent transport information architecture to be in charge of updating, implementing and maintaining the architecture.	FTA TraFi, ITS-Finland, LVM	2014–2015
Assess the need for and steps of any and all certification procedures for intelligent transport services and systems.	FTA MinTC, TraFi, ITS Finland, R&D sector, ITS Factory	2014–2015

and guide the development process. The architectural specification will include jointly defined and approved operating models and confirms the general architectural decisions and interfaces that are to be used. It will help establish better and more open prerequisites for commercial and public services, and it will be drawn up in accordance with the public sector’s architecture principles published by the Ministry of Finance.

The EU has drawn up the FRAME Architecture for European ITS. Its use has been voluntary and it is about to be revised. The intention is to define the procedures necessary to develop a basic ITS architecture, which will emphasise the compatibility, service continuity and multimodality associated with ITS and will allow Member States and their competent authorities to develop their own ITS architectures in conjunction with the private sector. Railway, air and maritime transport have their own, primarily global, ITS architectures and standards.

The definition of a transport information architecture will be a key part of the development of a Finnish ITS architecture. It will help create an overall view of Finnish transport information resources and a suitable structure for exploiting them.

When the information architecture is being compiled, all existing transport data will be inventoried and its structure and content assessed. Plans will also be made to further increase the opportunities for joint use and reuse of transport information, especially in interface services. The creation of a transport information architecture will tie into the projects concerning a transport data marketplace, transport real-time status data and a multi-service model.

4.2 Real-time situation picture of transport system status and operation

Real-time transport management is dependent on high-quality, wide-ranging awareness of the current status and can also involve predicting the way in which the situation is likely to change. This data will give a multimodal situation picture and will form the basis for action taken by public authorities and for private sector service production. This will be essential for the entire intelligent transport system, including a predictive control system for traffic networks.

4.2.1 Transport system situation picture

Real-time data on the transport system offers a real-time view of the traffic situation, the transport infrastructure, vehicle locations and conditions. This may be a graphic illustration of real-time data flows and transport performance indicators showing current figures and short-term forecasts of the amount of traffic, traffic flow, possible incidents, timetable accuracy and existing traffic conditions. This information can then be relayed to end users, service providers and other parties who could use the data. Such information will play a key role in improving transport safety and the quality, flow and predictability of all travel and transport.

A great number of commercial and public transport services – including traffic control, demand management, incident management and safety information services – depend on real-time data and the traffic situation picture that it describes. High-quality data will make these services not only possible, but also more effective. Investment in improving the quality of the data and service offered is likely to be recouped in the form of subsequent reductions in accident, congestion and emission costs and the creation of new business opportunities. The situation picture allows for the efficient handling of traffic incidents by making speedy incident prediction, identification and tracking possible.

Real-time transport information and the situation picture that this depicts can support public authorities in their regional transport system planning and especially in land use planning. The timeliness and accuracy of the information and the picture's ability to illustrate system-wide transport conditions will improve planning quality and the interoperability and efficiency of the transport system.

A real-time situation picture will also make it possible to offer commercial services based on time and location data. Many of these services will further the achievement of not just commercial business objectives, but also public transport policy objectives. Services such as guiding drivers to free parking spaces, providing traffic flow data and suggesting alternative routes, targeted

weather information and guidance services will attract users and thus benefit the commercial applications and help people travel more safely and smoothly.

The quality of the transport system situation picture will be directly dependent on the quality of the data used. As positioning technologies have quickly become more advanced and more widespread, positioning devices have become available to all. In-vehicle navigation devices and travellers' own mobile devices already allow travellers to produce raw data for the situation picture, but in the future, this data is likely to become considerably more useful. User-based information gathering is cost-effective, because it doesn't require heavy investment in fixed roadside equipment or system maintenance and repair.

The compilation of a real-time situation picture of the transport system is dependent on four processes: the creation of a common status information production model, and the collection, processing and distribution of the status information.

So far, there have been no joint agreements on the production of transport system status information, which makes the drafting of common information production methods and guidelines for the Ministry of Transport and Communications' administrative branch of vital importance. Once the status information has been produced in accordance with the set guidelines, it can be combined in different ways to create situation pictures that cater to specific information needs.

4.2.2 Proactive transport system operations

The aim of proactive transport system operations is to ensure the safety and smooth operation of the transport system in all situations by reacting immediately and efficiently to incidents and other problems and by trying to proactively prevent incidents from occurring.

Real-time, proactive transport system operations require up-to-date, highly compatible traffic control systems and systematic development and coordination of the actions and operating practices of the various stakeholders. The greatest impact on the cost-effectiveness of the transport system will be felt in major urban areas.

Table 3. Transport system situation picture projects

Main actions	Coordinator + participants	Timetable
<p>Draw up a national progress plan and a common status information production model that includes transport status information produced by commercial stakeholders. Take inventory of existing national, regional and transport mode-specific data collection, processing and distribution structures and processes.</p>	<p>MinTC, FTA, TraFi, FICORA, FMI, ITS Finland, large urban areas, ELY Centres / VALTTI, corporate sector, ITS Factory</p>	<p>2013–2014</p>
<p>Data collection Identify each user and stakeholder group’s key status information requirements and monitor their development. Take inventory of current information sources. Introduce new data collection methods and initiate the creation of additional methods if necessary. Promote and enable the use of communal data collection methods. Allow user-sourced information to be exploited fully.</p>	<p>FTA, MinTC, TraFi, FMI, ITS Finland, FICORA, large urban areas, corporate sector</p>	<p>2013–2016</p>
<p>Data processing Optimise the quality of the transport status information. Begin systematic improvement of transport data forecasts and analyses. Realise a transport system situation picture based on the status information. Pay special attention to developing cooperation between different authorities.</p>	<p>FTA, MinTC, TraFi, FMI, FICORA, ITS Finland, large urban areas, research institutes, corporate sector</p>	<p>2013–2016</p>
<p>Data distribution Focus development on the open and free distribution of extensive, high-quality, standardised traffic flow and incident data. Establish jointly agreed terms and guidelines to promote the easy utilisation of cross-administrative status information.</p>	<p>FTA, MinTC, TraFi, FICORA, ITS Finland, FMI, large urban areas, research institutes, corporate sector</p>	<p>2014–2016</p>
<p>Begin to work closely together with commercial stakeholders to create and use a situation picture. Cooperate with open development communities to produce transport status information.</p>	<p>FTA, MinTC, TraFi, FICORA, ITS Finland, large urban areas, research institutes, corporate sector, Forum Virium, Apps4Finland community, ITS Factory</p>	<p>2013–2016</p>
<p>Assess and define the legal terms for using public information resources in such a way that they facilitate the creation and commercialisation of services based on open data.</p>	<p>MinTC, FTA, TraFi, FICORA, ITS Finland, large urban areas, research institutes, corporate sector</p>	<p>2013–2014</p>
<p>Carry out a cross-administrative assessment of the expectations, involvement interests and possible synergies for non-transport sector stakeholders associated with the compilation and use of the situation picture.</p>	<p>MinTC, government sector</p>	<p>2013–2014</p>

In practice, investment will need to be made in new traffic control systems and in ITS tools, and actions and operating practices will need to be better coordinated.

4.2.3 New traffic control systems

There is a great deal of pressure to improve and further develop the road, maritime and rail traffic control systems maintained by the Finnish Transport Agency (FTA). The aim is to increase the reliability and usability of the systems and to improve the quality of the multimodal real-time transport situation picture. The traffic control system renewal project will consist of equipment and service procurement and the definition, realisation and introduction of the new systems.

The new traffic control systems being developed will be *multi-purpose traffic management tools* that will allow traffic controllers to keep up with the status of and predicted changes in the transport situation picture. The development of risk identification methods, integrated support and warning systems for decision-makers and systems intelligence will prevent accidents and reduce their negative impacts on other traffic. The safety of local problem sites, safety-critical road sections and tunnels will be ensured by using dynamic traffic control to supplement other safety systems.

The aim is to optimise transport network use, especially for individual transport

modes, but in the long run for all traffic – i.e. there will be a shift from mode-specific operations to transport system and network management based on a range of services produced jointly by several stakeholders. A study on the potential for introducing traffic pricing has helped to prepare for the prospect that use of the transport network and system may need to be more closely regulated.

The goals of the rail traffic control system modernisation are to improve the timetable accuracy and operational reliability of rail traffic and to make the control systems more compatible with EU requirements. Traffic control systems will be automated further and the efficiency of traffic control operations will be increased.

The primary aim for road traffic is to improve traffic flow and safety. This will be achieved by standardising existing control applications and by further developing monitoring and decision-making applications and automated incident management tools. Special attention will be paid to the development of information services, the real-time situation picture and short-term traffic forecasts.

The main aim for maritime transport is to develop maritime incident management and traffic analysis applications and surveillance equipment. The control system upgrading also aims to meet the international obligations set by the IMO and the EU.

Table 4. Traffic control system renewal projects

Main actions	Coordinator + participants	Timetable
Carry out the traffic control system renewal project.	FTA	2013–2017
Develop innovative and interoperable driver surveillance and support systems to increase travel safety.	Research institutes, corporate sector, FTA, MinTC, TraFi, ITS Finland, municipal sector	2013–2017
Develop and encourage information distribution between roadside devices and vehicles or in-vehicle devices and between vehicles. Support and contribute to national and international development and implementation projects and areas.	FTA, research institutes, corporate sector, MinTC, TraFi, ITS Finland, municipal sector	2015–2016

Air traffic control systems are not included in the control systems renewal project being carried under the leadership of the Finnish Transport Agency. However, there are European projects under way, chief among them the air traffic management system development project Single European Sky (SES), which aims to create more direct flight routes, savings in flight times, more accurate flight timetables and reduced air traffic emissions.

Coordination of actions and operating practices

The aim of efficient and open cooperation between all the relevant authorities in major urban areas is to reduce urban congestion, improve the reliability of passenger and goods transport chains and timetables, ensure awareness of the available travel modes, increase public transport use, improve the air quality in cities, and delay and reduce the need for large infrastructure construction projects. As the amount of traffic continues to increase, urban stakeholders will exploit new technology, utilise their own expertise and adopt effective cooperation models to ensure cost-effective operations and a good level of service.

As we move towards the operation of an integrated transport system, special attention must be given to operating practices by establishing *jointly agreed contingency and traffic management plans*. These plans provide detailed models for actions that should be taken to prevent or at least manage both predictable and unexpected incident situations. The traffic management plans will be drawn up in cooperation with regional stakeholders and synchronised with regional incident management systems. All actions should take into consideration the need to coordinate the operations of all public transport operators in a given region and the need to reflect the shift in focus from reactive to proactive transport system operations.

The aim is that cross-administrative regional traffic management centres will form the core of traffic management in major urban areas. Each centre will include an FTA (Finnish Transport Agency) Traffic Management Centre and representatives of e.g. the city, the police and public transport authorities. Interoperable, jointly used and acquired regional traffic management systems and services will produce satisfied, informed and aware users of the region’s transport system, high-quality and easy-to-use services, and efficient, more productive cooperation

Table 5. Transport management cooperation projects in major urban areas

Main actions	Coordinator + participants	Timetable
Agree on common operating models and tools in large metropolitan areas, i.e. Helsinki, Tampere, Turku and Oulu. Favour the joint procurement and use of information by the authorities. Procurement cooperation aims at procedures that favour innovation, wide-ranging PPP activity and precommercial procurement.	FTA, municipal sector, ELY Centres/ VALTTI	2014–2016
Connect public transport incident management and passenger information and traffic signal control more tightly to the regional traffic management centres. Promote the introduction of public transport traffic light priorities wherever this is appropriate for the overall functioning of the transport system.	FTA, municipal sector, ELY Centres, rescue services	2014–2016
Invest in strengthening cooperation in the fields of mobility management and traffic management services in order to ensure the smooth flow of passenger and goods transport chains.	FTA, municipal sector, ELY Centres	2013–2015

between different authorities. Advanced park & ride systems and the real-time information services that support them will increase the efficiency of the regional transport system.

4.3 Integrated public transport system

Increasing the number of public transport users and the share of all trips that are taken using public transport is vital for attaining the transport policy objectives. However, it has become apparent during the past few decades that this will be extremely challenging. Every possible means must be utilised to increase the competitiveness of the public transport system by raising the level of service to be on par with – or even superior to – that offered by private car use. We need a customer-oriented, integrated public transport system.

In an integrated public transport system, public transport users will reap the immediate benefits in the form of convenience and ease of use, increased service provision especially in urban areas, and the possibility of paying less all across the travel chain.

In interoperable public transport, both physical transport and the associated systems will be interoperable and will operate smoothly. An integrated public transport system will include common timetable and route information and payment systems. It will also seamlessly integrate feeder traffic with public transport by exploiting both intelligent park & ride applications and the potential offered by taxis and demand-responsive public transport. The benefits of an integrated public transport system will derive from the integrated implementation of all its components.

Table 6. Public transport information service projects

Main actions	Coordinator + participants	Timetable
Draw up customer-oriented objectives for passenger information interoperability. Make the attainment of these objectives a precondition for obtaining public funding.	FTA, competent authorities, MinTC	2013
Cooperate with other stakeholders to write technical specifications for the short and long term ,for developing system interoperability.	FTA, competent authorities, MinTC	2013–2014
Implement or procure a next generation public transport joint database for the Finnish Transport Agency. Introduce the necessary regulations to ensure that the database has all the information it needs and that the information can be passed on to third parties. Assess the ways in which real-time public transport information (tracking and incident data) can be developed or utilised in the development of public transport information services.	FTA, competent authorities, MinTC	2013–2015
In accordance with the principles of open data, allow companies access to the public transport joint database so that they can use it to create new services.	FTA, competent authorities, MinTC, corporate sector	2013–2014
Expand the route planner service to cover all public transport services in Finland. Private service providers can utilise the Finnish Transport Agency's joint database in their route planning services.	FTA, competent authorities, MinTC, public transport companies	2014–2015

4.3.1 National public transport timetable and route planning service

Passengers should have access to a national, multimodal route planner that is accessible to all and that serves the needs of special groups, such as people with impaired vision, hearing or restricted mobility. The route planner will provide information on public transport routes, timetables, ticket prices and possible ancillary services. Time and location-specific information must be available through mobile devices, so that travellers can use their smart phones or other intelligent terminals to access all the information they need about their current location and instructions to the most convenient public transport stop.

The national public transport timetable and route planning service will be based on the Finnish Transport Agency's public transport joint database, which also forms the basis for the current Matka.fi service. The aim is to gather together information from all operators in the joint database and expand the Matka.fi service into a nationwide system. Private stakeholders will be given the opportunity to join the system and to utilise the passenger information in their own mobile and online services or in the creation

of new information services in accordance with the principles of open data.

Nationwide interoperability can be achieved through the above integrated systems or through common interface definitions, in which case the focus will be on increasing the compatibility of the various systems. No matter which approach is chosen, the aim is to ensure that the static and real-time information produced by the authorities can be exploited as freely as possible by all stakeholders.

4.3.2 Interoperable payment system

An interoperable public transport sales and payment system must allow passengers to pay for all parts of a travel chain with a single travel card or other commonly used payment method. The payment system will be based on the principle of "single payment method, one stop shop". An interoperable payment system will produce the greatest benefits in urban areas, where the goal is to have one regional ticket that covers all bus and train traffic inside the commuter belt.

In the future, payment system interoperability should be expanded to include park & ride facilities, taxis and other public transport services. The payment system will exploit the potential

Table 7. National public transport payment system projects

Main actions	Coordinator + participants	Timetable
Draw up customer-oriented objectives for payment system interoperability. Compose the necessary technical specifications. Make the attainment of these objectives a precondition for obtaining public funding.	FTA, competent authorities, MinTC	2013
Implement a national public transport payment system for the competent authorities as a purchased system or a service.	FTA, competent authorities, MinTC	2013–2017
Take into account the potential and demands of the latest payment technologies (mobile payments – NFC, contactless smart cards – EMV) so that they can be integrated into the system in the future if necessary. Assess the potential of a system based on cloud services.	FTA, competent authorities, MinTC	2013–2017

of new payment technologies, such as NFC technology and contactless credit cards. When creating future solutions, it is vital to carefully examine the potential inherent in new technologies, such as cloud services.

4.3.3 Public transport traffic signal priorities in major urban areas

Not only should all parts of a trip chain be compatible, but each part must function perfectly to achieve a good result. Traffic signal priorities for public transport can speed up public transport trips and increase their fluency. The bus identification technologies used to facilitate signal priorities in different areas must be cost-effective and compatible with one another. To reach this goal, municipalities must cooperate when purchasing new signal devices for their

intersections. This in turn calls for extensive discussions and planning between the interest groups that require signal priorities and the municipalities that maintain the signal priority systems.

4.3.4 Door-to-door trip chains for public transport

To ensure the competitiveness of public transport it is vital to achieve a level of flexibility and functionality similar to that of private car use, but without the responsibilities and costs associated with private car ownership.

Investment in the development of feeder traffic, including park & ride payment systems, information services, and ensuring the compatibility of all trip chains, will provide brand new opportunities for improving the

Table 8. Public transport traffic signal priority projects

Main actions	Coordinator + participants	Timetable
Install public transport traffic signal priority systems at major intersections. Introduce national interoperability definitions that support the creation of public transport signal priorities while taking into consideration the needs of both local and long-distance transport.	Municipal sector, FTA, MinTC, ELY Centres	2014–2017

Table 9. Flexible and intelligent feeder traffic projects

Main actions	Coordinator + participants	Timetable
Assess how intelligent demand-responsive public transport can advance the creation of a unified public transport system through the HRT's Kutsuplus.fi service pilot.	HRT, City of Helsinki, FTA, MinTC	2013–2014
Assess how advanced demand-responsive public transport services can be expanded to other cities and especially to sparsely-populated areas.	FTA, HRT, MinTC, Finnish Taxi Owners Federation, municipal sector, ELY Centres	2014–2016
Assess the potential of other intelligent and flexible transport and mobility services especially if used in sparsely-populated areas. Focus on passenger transport financed by the public sector.	FTA, MinTC, MSAH, MinEdu, KELA, Finnish Taxi Owners Federation, municipal sector, ELY Centres	2014–2017

level of service and customer satisfaction. The development of new types of taxi services, new collaborative consumption and collective ownership services such as car sharing and car pooling services, and especially feeder traffic services based on intelligent demand-responsive public transport is essential for the development of door-to-door public transport services in towns and cities as much as in more sparsely populated areas.

4.4 Intelligent traffic surveillance and enforcement

Driving speeds are regulated by setting speed limits and seeing that they are observed. Numerous Finnish and international studies have shown that speed cameras can successfully reduce the number of speeding offences and the number and severity of the resultant accidents. For instance, the introduction of cameras along Kaivokatu in Helsinki reduced by two thirds the number of vehicles travelling at more than 10 km/h above the speed limit.

The development of automated camera surveillance and enforcement and municipal enforcement has been outlined in the intelligent transport strategy and in the road safety programme ('Putting words into action'), published in 2012. If municipal enforcement is to be expanded, municipalities will have to be reimbursed for the cost of the camera surveillance.

Automated camera surveillance and enforcement is the only key project from the first intelligent transport strategy not to have progressed as intended (2009–2012), due primarily to a lack of police and municipal resources. This is primarily a question of failing to record the benefits appropriately against the costs, since the direct and indirect benefits of automated enforcement far outweigh its costs.

In recent years, enforcement technology has advanced by leaps and bounds. Automated or technical surveillance and enforcement can be used to automatically monitor for example the following offences:

- Speeding (both spot speeds and average speeds)
- Running a red light
- Failure to wear a seat belt
- Following too closely
- Misuse of bus lanes
- Ignoring "No thoroughfare" signs
- Uninspected vehicles
- Unregistered vehicles
- Uninsured vehicles
- Vehicles banned from use

Of these, the biggest risks to traffic safety are posed by speeding, running red lights, failure to wear a seat belt and following too closely. The technical surveillance of bus lane use and obeying of "No thoroughfare" signs have wider impacts for transport system operations.

Changes to camera surveillance are necessary because:

- camera enforcement is the most cost-effective current method of promoting transport safety
- the police can then allocate fewer resources (money and human resources) towards camera enforcement
- municipalities wish to improve transport safety and are willing to participate in traffic enforcement
- the main enforcement bottleneck continues to be 'police paperwork', i.e. the identification of miscreant drivers and ensuring that the correct people get fined or otherwise punished.

Automation of enforcement would be significantly easier if the offences being monitored were subject to administrative sanction in the manner of parking violations, because this would mean that the driver would not have to be identified.

The importance of road traffic enforcement will only diminish when road traffic becomes as automated as rail and air traffic. But this is a long way off, and until then, efficient traffic enforcement is needed as a way of influencing choices made by drivers.

Table 10. Intelligent traffic enforcement projects

Main actions	Coordinator + participants	Timetable
Revise the sanction system for road traffic to simplify and speed up the sanctioning offences caught through automated traffic enforcement. Municipalities will participate in traffic enforcement operations.	FTA, MinTC , InterMin , Finnish Police, City of Helsinki, municipal sector	2013–2014
Assess the potential for joint procurement and synergies of camera enforcement investment for the entire transport sector administration, authorities and police.	FTA , MinTC, InterMin, Finnish Police , City of Helsinki , municipal sector	2013–2014
Increase the road coverage of camera enforcement systems by a thousand kilometres (current coverage is 3,000 km).	FTA , MinTC , InterMin , Finnish Police , MoF	2014–2016
Double the number of mobile camera enforcement units (current number is 15).	MoF , InterMin , Finnish Police , FTA, MinTC	2014–2015
Get municipalities to participate in camera enforcement – 50 cameras introduced in built-up areas, 30 of which will be in Helsinki.	FTA, MinTC , InterMin, Finnish Police, City of Helsinki , municipal sector	2014–2015
Use existing enforcement systems and automated cameras to monitor issues such as average speeds, following too closely, seat belt use, bus lane use and the obeying of “No thoroughfare” signs.	FTA, MinTC, TraFi, InterMin, Finnish Police, City of Helsinki , municipal sector	2015–2017

4.5 Reactive and proactive safety systems

Proactive safety systems can improve traffic safety by preventing accidents and by reducing the negative impacts of accidents that have already occurred.

4.5.1 Reduction of severity of accidents

In the near future, the severity of accidents will be reduced primarily through the large-scale implementation of the automated emergency call system eCall and traffic signal priorities for emergency vehicles.

The Europe-wide eCall system will be implemented in accordance with the European Commission’s definitions as part of the national implementation of the ITS Directive. From 2015 onwards, the eCall device must come as standard in all type-

approved cars in Europe, telecommunication networks must be designed to prioritise eCall messages, and emergency response centres must be equipped to handle eCall communications.

4.5.2 Accident prevention

Accident prevention deals with the common causes of accidents, such as driving while intoxicated (DWI), speeding and human error.

The biggest potential for accident prevention is through the large-scale introduction of *cooperative systems*. These systems are based on automatic communication among vehicles or travellers and between travellers and the transport infrastructure. This allows vehicle systems to reduce travellers’ observational and other errors by warning them about impending hazards and by even taking evasive action or

Table 11. Reactive safety system projects

Main actions	Coordinator + participants	Timetable
<p>Ensure national eCall system readiness in accordance with the common action plan of the authorities responsible.</p> <ol style="list-style-type: none"> 1. Relaying eCall messages to emergency response centres through the mobile phone network as defined in the action plan 2. System requirement compliance and possible inspection procedures of eCall devices 3. Emergency response centre readiness to receive eCall messages as defined 4. Determine national cooperation model and interface between emergency response centres and commercial service centres 	TraFi , MinTC, InterMin, emergency response centres, corporate sector	2013–2014
<p>Realise traffic signal priorities for emergency vehicles as a nationally uniform solution by exploiting the same technology used to implement public transport signal priorities.</p>	TraFi, FTA , MinTC, InterMin, emergency response centres, emergency services, municipal sector	2014–2016

Table 12. Proactive cooperative system projects

Main actions	Coordinator + participants	Timetable
<p>Promote the availability of transport information services required by cooperative systems</p> <ol style="list-style-type: none"> 1. Open data and available data 2. Enabling of information services that improve safety 3. Introduction of warning systems at level crossings 	FTA , MinTC, TraFi, Finnish Meteorological Institute (FMI)	2013–2015
<p>Actively integrate cooperative systems into ITS pilots and trial areas.</p>	FTA , MinTC , TraFi , ITS Finland, corporate sector	2013–2016
<p>Promote retrofitted and nomadic applications at EU level.</p>	TraFi , MinTC, FTA , ITS Finland	2013–2016
<p>As a special cooperative system project, implement a warning system for level crossings by carrying out a large-scale system pilot and impact and functionality assessments, which will then be used as the basis for decisions about follow-up actions to equip trains, level crossings and travellers with the system.</p>	FTA , TraFi, MinTC, research institutes	2013–2015
<p>Assess driverless vehicles' business potential, legislative requirements and potential profitability for the transport sector.</p>	FTA , MinTC , MEE , TraFi , research institutes, corporate sector	2013–2015
<p>Carry out more large-scale cooperative system trials and implementation in vehicles and integrated mobile devices.</p>	FTA , MinTC , TraFi , FMI, research institutes, corporate sector	(2016–2020)

Table 13. Alcolock promotion projects

Main actions	Coordinator + participants	Timetable
Assess the prerequisites for expanding alcolock use especially in professional transport 1. Public transport and maintenance contracts, quality criterion 2. Legislative means	FTA, MinTC, InterMin, TraFi, corporate sector	2013–2014
Support making the alcolock mandatory standard equipment in all new cars in the EU	FTA, MinTC, TraFi	2013–2016

braking if the vehicle is in danger of crashing. Until now, the development rate has been mostly dependent on the actions of the automotive industry, but now development efforts in Finland will focus on applications based on retrofitted and nomadic devices. This will also allow systems to be installed in older vehicles and even on bikes.

The most advanced systems in the world allow vehicles to move without a driver. The pioneers in the field of road traffic are the Google Driverless Car and the states of Nevada and California, which have allowed “robot cars” on their roads. No European countries have allowed driverless vehicles on their roads. On a smaller scale, new vehicles already include several advanced, automatic support systems, such as adaptive cruise control, lane departure warning and parking assistance systems. There is also much potential for the use of “robot vehicles” in public and goods transport. Driverless metro systems are already in use around the world. In Finland, Helsinki Region Transport (HRT) has decided to automate its metro system.

Visionaries and experts agree that driverless vehicles have a great future in front of them – in terms of both their impact on transport and their inherent business potential.

Reducing the incidence of DWI is an essential part of transport safety. Drunk drivers are involved in a quarter of all fatal road traffic accidents. Alcolocks are an efficient means to prevent DWIs, and their use was made mandatory in day care and school transport from August 2011. The use of the alcolock to reduce DWIs is an on-going activity.

4.6 Multi-service model for transport

The aim of the multi-service model is to produce a variety of mobility services in an accessible and inexpensive way. At best, all services will be available under one contract or for a single fee. The services may exploit common basic elements, such as user identification and tracking, data transfer, payment processes etc. Consumers would be able to select a device of their choice bundled with a service package or order the services later on, which is similar to how they purchase mobile phones and teleoperator service packages. The multi-service model can be used to replace multiple separate devices and systems and thus achieve savings.

Service providers (authorities and commercial operators) will use the multi-service model to create service/operator synergies and new business opportunities. The aim is to create an ecosystem of public and private services that will function as an integrated network, not just as individual services. It is hoped that the authorities will promote the development of services under the multi-service model by releasing open data, for example. The advancement of the multi-service model will also create expertise and technical tools that can be exploited if necessary in the planning of a location-based road user charging system. Public-private partnership in the field of ITS provides an excellent framework for the creation of new kinds of operating models and service structures, which may lead to successful exports.

Semi-official services, parafiscal charges such as road user charges, and any other charges will be settled in accordance with legally prescribed and certified processes. Road user charges and other transport pricing issues are handled by the working group on fair and intelligent transport, which has until the end of 2013 to assess the transport, technical, economic and legislative issues associated with road user charges.

In the future, travellers will be able to easily access and use mobility, entertainment, navigation, driver support and transport mode-specific apps through fixed or portable in-vehicle terminals. Terminals will automatically connect with a vehicle's data bus and exploit its data and resources. The next generation of mobility services aim to be independent of technology, vehicle manufacturer, models or service providers.

In the multi-service model, service users are also producers of raw mobility data. They produce data for both commercial and authority services, e.g. for real-time traffic flow charts and situation pictures. The multi-service model is characterised by use of the same information (once it is produced) to create numerous services, the extensive

distribution and exploitability of open data, and a high level of data and privacy protection.

Public authorities do not intend to develop their own technical multi-service platform, but to support commercial stakeholders in creating services and service platforms based on the multi-service model. They can also provide or, in some cases, procure public authority services through the commercial platforms mentioned above. One or more commercial service operators and/or platforms offering services to the authorities, corporate clients and consumers are expected to be created in Finland. In the future, it will be necessary to assess whether the authorities can develop their procurement and financial models to take into account service impacts and user numbers. The multi-service model cannot be developed unless commercial stakeholders open their service and customer interfaces. This will lead to the creation of a common multi-service model interface that will allow service production, service integration and effective customer penetration by exploiting not only new but also existing services and customers.

Table 14. Multi-service model projects

Main actions	Coordinator + participants	Timetable
Produce services in conjunction with commercial stakeholders according to the multi-service model. Launch a PPP-based pilot examining how to develop the distribution of ITS Directive-compliant free safety information using the multi-service principle.	FTA, MinTC, TraFi, FMI, ITS Finland, corporate sector	2013–2015
Develop user-based and impact-based procurement procedures to support networked service production and the creation of a multi-service business model.	FTA, TraFi, MinTC, ITS Finland, corporate sector	2013–2015
Invest in international cooperation with other countries' transport authorities, other public stakeholders and ITS sector stakeholders to create and establish standards to support the multi-service model.	FTA, MinTC, TraFi, FMI, ITS Finland	2013–2015
Produce 1–3 authority services in the multi-service model environment.	FTA, MinTC, TraFi, FMI	2014–2016
Define and implement service level requirements and legislative reforms that may be required by the platform and services.	FTA, MinTC, TraFi, research institutes, corporate sector	2014–2016

4.7 Intelligent logistics

Logistics is vital for business competitiveness. More than ten per cent of corporate turnover is spent on logistics, and 43 per cent of the competitiveness of large commercial companies and 35 per cent of that of manufacturing companies is due to logistics (Finland State of Logistics 2012, MinTC Publications 25/2012). It is therefore vital to ensure the constant improvement of logistical efficiency both absolutely and in relation to our main international competitors. A significant part of Finland's logistics capability consists of seamless domestic and international delivery chains. Data transfer, electronic operating practices, and the compatibility and fluency of procedures are important issues for both businesses and the authorities.

In order to increase logistical competitiveness, the primary objective of intelligent logistics is to carry on the development and introduction of electronic documents and operating models so that all paperwork associated with the delivery chain can be processed electronically and all members of the delivery chain use electronic documentation.

The long-term goal is to digitise logistics. Individual items will have fixed electronic identifiers (e.g. RFID - Radio-frequency identification, SSCC - Serial Shipping Container Code), which will allow orders and even individual packages to be tracked and tracking services to be developed. A national Single Window system capable of processing multimodal electronic data should be created to develop and increase the efficiency of import and export tracking and services. The objectives coincide with those defined by the EU, which are to be realised in the eFreight Project as part of the EU's 7th Framework Programme.

There has been a determined effort to develop electronic operating procedures in cross-border logistics chains within the EU. Several bilateral projects have also been carried out to increase the efficiency of border crossings between Finland and Russia. Now that Russia has joined the WTO, the results of these projects can be utilised in other European countries.

4.7.1 Electronic operating models for goods transport

Electronic logistics procedures are a prerequisite of flawless, high-quality and cost-effective transport operations. At the moment, Finnish stakeholders have enough expertise, materials and services to introduce electronic logistics procedures in companies of various sizes.

Standardised electronic transport information will help all members of the logistics chain to carry out their duties. This will ensure a high level of service for customers and operational predictability for transport companies, and will also make possible a range of added value services. A concrete example of electronic operating procedures is the use of electronic messages in domestic and international goods transport. The aim is to fully automate data transfer within the transport chain.

The introduction of electronic procedures is largely dependent on the active participation of transport operators and their customers. The challenge is to make them realise the benefits of electronic procedures and be a part of the electronic logistics chain.

4.7.2 Intelligent maritime and port services

Under the EU Directive on reporting formalities (2010/65/EU), the use of the Single Window concept to collect vessel report information will be mandatory from 1 June 2015 onwards. Finland's PortNet system will have to be updated to support the Single Window concept. Messages and interfaces will also have to be standardised to make PortNet compatible with the Port Community Systems (PCS) used at some ports.

The Tanker Safety system has successfully been used to electronically transmit vessel route plans directly to the maritime traffic centre. The Finnish Transport Agency intends to expand the system.

Finland is participating in an EU project to develop a Common Information Sharing Environment (CISE) for maritime transport for EU and EEA Member States. It will use standardised interfaces to integrate all existing surveillance systems and networks,

thus providing the authorities with all the information they need for maritime surveillance.

4.7.3 Intelligent customs services

Finland uses advanced electronic customs systems for transit (NCTS), export (ELEX) and import (ITU) declarations, for declarations for goods entering and leaving the EU (AREX), and for AEO applications. At the EU level, the aim is that by the end of the decade the entire customs environment should operate electronically.

4.7.4 Intelligent aviation services

In Finland, the aim is to apply the eFreight model to aviation services in accordance with the guidelines set by the International

Air Transport Association (IATA). It must be ensured that all air carriers operating in Finland can implement the eFreight model.

4.8 Smarter and more eco-friendly mobility

Finland is committed to reducing its greenhouse gas emissions at a global, EU and national level. In transport, the aim is to reduce emissions by 16 per cent by 2020 (compared to 2005 levels) and by 80 per cent by 2050 (compared to 1990 levels). A wide range of measures will need to be taken to achieve such significant reductions.

Transport policy tends to focus on the development of the transport infrastructure and traffic conditions. Recent advances in information and communications technology

Table 15. Intelligent logistics projects

Main actions	Coordinator + participants	Timetable
Promote the implementation of electronic operating procedures and find a way to encourage small transport operators to use electronic solutions. The aim is to increase the use of electronic transport documents at least to the level of the other Nordic countries.	Corporate sector, MinTC	2013–2014
Draft missing electronic messages using the EDIFACT and XML formats (UBL). This will expand electronic procedures to cover the entire delivery chain, ensure that the messages are useable with all modes of transport, and make recommendations for intermodal data transfers.	Corporate sector, MinTC	2014–2015
Update PortNet messages to use the XML format to prepare for the implementation of the Single Window concept.	Corporate sector, MinTC, FTA	2014–2015
Advance the interoperability of delivery address and location data systems so that they will better support electronic transport procedures and operating models.	MinTC, corporate sector	2014–2015
Implement a national multimodal Single Window system based e.g. on the EU's Next Generation National SW guidelines and use of the PortNet system.	FTA, MinTC, corporate sector	2015–2017
Fully automate data transfer within the logistics chain and have transported goods "communicating" with the systems. Introduce SSCC or similar codes nationwide.	MinTC, MEE, research institutes, corporate sector	2016–2020

and vehicle technology have brought new perspectives and opportunities for attaining transport policy objectives. The most promising of these include *traveller and mobility management and electric transport*.

4.8.1 Traveller and mobility management

The implementation of the transport policy objectives hinges on individuals and individual choices; in the end, the success of transport policy culminates in the choices individuals make in their various roles as employee, employer, parent, driver, passenger, and while commuting, on holiday, enjoying their leisure time, etc. Traveller and mobility management aims to influence the actions and choices of both individuals and organisations in a number of different ways and can be roughly divided into:

- influencing the need to travel
- influencing modal choice
- influencing driving habits

Influencing the need to travel

Influencing the need to travel is not a new idea, but advances in information and communications technology and especially in social media and remote technologies have opened up more concrete possibilities for its implementation. In accordance with

the Government Programme, the aim is to promote the implementation of ITS solutions that exploit information and communications technology in all sectors of society. As services based on remote facilities and virtual presence become more common, people's need to travel will be affected, opening up markets for new flexible and intelligent mobility services. The optimal transport system for travellers and for transport policy objectives can be attained through coordinated transport and land use planning and the planning of intelligent services.

Influencing the choice of travel method

Mobility management will be used to influence *the choice of travel method*. People will be encouraged to choose more sustainable travel methods that burden the transport system less. The aim of mobility management will be to increase the use of sustainable transport modes and reduce private car use. Environmentally and socially preferable travel methods include walking, cycling, public transport use, car sharing and car pooling.

Mobility management typically involves informing people about sustainable transport modes through information services and marketing. It often also involves service development. Mobility management methods include:

Table 16. Projects associated with influencing the need to travel

Main actions	Coordinator + participants	Timetable
Ensure that influencing the need to travel is a more integral part of future transport policy and intelligent transport.	MinTC , FTA, municipal sector, research institutes	2013–2017
Participate in the development and implementation of solutions that reduce people's need to travel. Favour and promote the use of telecommuting and video conferencing throughout the administrative branch.	FTA, MinTC , TraFi, research institutes, corporate sector, municipal sector, ELY Centres, Regional Councils	2013–2016

CO₂ emissions (g/km) / Energy class:

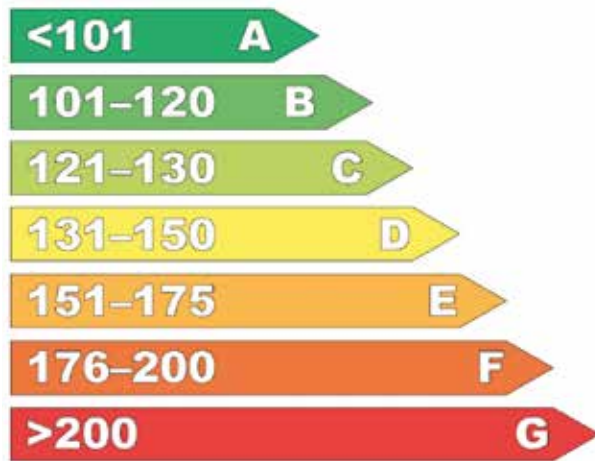


Figure 4. Vehicle energy efficiency, fuel consumption and emission information

- organisational travel planning, travel plans
- direct marketing and personal guidance (residential areas, new residents, families, students, workplaces etc.)
- services providing real-time mobility information (e.g. route planners, counters etc.)
- campaigns, trials, training (Cycle to Work Day, test passengers, mobility training etc.)
- communal car use services (e.g. car sharing, car pooling)
- vehicle selection guides and energy efficiency markings (e.g. TraFi's online car comparison engine EkoTrafi and Motiva's car selection service)

Mobility management methods will generally be usually cost-effective, and as they become more popular they will significantly affect issues such as greenhouse gas emission levels and transport safety. New mobility management services will include car sharing and car pooling services, the usability of which can be increased exponentially by exploiting time and location-specific ICT services. ITS will make mobility management increasingly available to travellers during their journeys.

The idea behind *car sharing* is that you do not need to own a car yourself, but can

reserve a car to use when you need to. Car sharing is part of a larger global trend called collaborative consumption, which provides an ecological alternative to traditional consumption. Collaborative consumption is the sharing of products, services, skills, spaces and tasks among several consumers by utilising open mobile and online platforms. A shared car can be reserved flexibly at any time of the day for even short periods of time, near one's home or place of work. The car can be reserved online or by phone and activated with a smart card or mobile phone. Different types of vehicles are available for car sharing. At the moment, there is only one car sharing company in Finland, but there is potential for more companies to enter the market. Peer-to-peer car sharing is also available. This is similar to car sharing, but the shared cars are owned by private citizens. Shared cars have the potential to relieve transport problems, since according to the global market leader in car sharing, one shared car can mean 20 fewer vehicles in the traffic figures.

Car pooling is when two or more people agree to share a ride to work, leisure-time activities, etc. The law allows car pooling and paying for car pooling, as long as the payment given to the driver only covers the travel costs – i.e. car pooling is not used by the driver to earn a living. Traditionally, car pooling was only practised by people who were previously acquainted, but now there are several online car pool exchanges, where you can offer or look for rides. Advanced car pooling services can come in handy particularly in sparsely-populated rural areas, where public transport services are often not economically viable.

Mobility management services can present both challenges and opportunities for the ITS sector. The popularity of mobility management services depends greatly on their quality and accessibility. The seamless meeting of supply and demand is of special importance, and is made possible particularly by time and location-specific information services. In the future, seamless transport and information services will be able to create entirely new kinds of comprehensive transport services, in which separate services are individually tailored into multimodal service packages in accordance with the Traffic as a Service principle.

Table 17. Projects associated with influencing the choice of travel method

Main actions	Coordinator + participants	Timetable
Support the organisation of mobility management work and standardise best practices at national level. The support offered can be both information-based (nationwide coordination supports regions) and financial (government subsidies for mobility management). Promote the integration of mobility management procedures into urban transport management and the operations of transport management centres.	FTA, MinTC, municipal sector, Motiva, research institutes, corporate sector, ELY Centres, Regional Councils	2013–2015
Develop mobility management impact assessments and take the results into consideration when deciding on subsidies. Exploit the available information on the costs and environmental impacts of different transport modes. Extend mobility management principles more and more to professional transport, in which responsible transport should also be favoured (by customers, businesses and drivers).	FTA, MinTC, TraFi, municipal sector, Motiva, research institutes, corporate sector	2013–2015
Participate in the development and introduction of alternatives to private car use. Take new mobility means into consideration when drafting new legislation.	MinTC, FTA, TraFi, research institutes, corporate sector	2013–2016

Influencing driving habits

The impacts of driving habits on safe, economic and eco-friendly driving are well known. Traditionally, efforts to influence driving habits have been through information and awareness-raising. The results have been encouraging but insufficient, especially with those groups of drivers who most need to change their driving habits. There are several problem areas that can be identified in road traffic:

- the number of serious accidents involving new drivers has not fallen in recent years
- the number of accidents involving professional drivers is falling more slowly than average
- the ageing population means more pressure to ensure driver competence
- speeding, alcohol and failure to use safety equipment are the main contributing causes of serious accidents
- the principles and potential of eco-friendly driving are not commonly known.

Intelligent solutions originally developed for use in monitoring driving behaviour can be used to improve driving habits. Trials indicate that driving safety, economy, eco-friendliness and comfort can all be significantly improved by influencing driving habits. The information provided by in-vehicle systems in new vehicles and by various retrofitted monitoring devices makes it possible to monitor driving habits and influence potentially dangerous driver behaviour.

Nowadays, there are commercial products and services that encourage responsible driving behaviour and thus help realise the transport policy objectives. However, the commercial spread of these services is relatively slow. It would therefore make sense to pinpoint which commercial services are of greatest benefit in transport policy terms, and then encourage the use of these services. Nowadays, there is a reasonable level of public funding available for the development of these types of innovations, but there is hardly any funding available for the implementation phase.

Table 18. Projects associated with influencing driving behaviour

Main actions	Coordinator + participants	Timetable
Increase driver awareness of the significance of driving behaviour for travel costs, safety and the environment. Create a system for collecting driving behaviour information and giving feedback to drivers. Exploit new information and mobile technology to tailor feedback to specific target groups. Encourage the use of defensive driving by truck drivers for example as part of transport energy efficiency agreements	TraFi , FTA, MinTC, research institutes, corporate sector	2013–2015
Launch the TrafiSafe project, which uses driver feedback to assess the current and potential adoption of safe and eco-friendly driving styles. Develop an open, authority-approved driving behaviour indicator model. The results can be used to assess user interfaces and the readiness of commercial stakeholders to introduce and standardise the driving behaviour indicator model.	TraFi , FTA, MinTC, research institutes, corporate sector	2013–2015

4.8.2 Towards intelligent electric transport

The European Commission’s White Paper on Transport has set the goal of cutting the use of cars that run on fossil fuels by half in cities by 2030, and phasing out all such cars in cities by 2050. Carbon-free urban logistics should be the norm in large urban centres by 2030. These goals will be difficult to reach, but they present not only challenges but also great potential for stakeholders.

Electric cars represent the most promising alternative to cars that run on conventional fuels. A shift to electric cars could reduce both greenhouse gas emissions and dependence on oil, and also encourage the use of renewable energy and intelligent electrical networks throughout other sectors. The ability to store electricity from renewable energy presents a challenge for energy systems of the future. Electric car batteries may play a key role in this issue. Renewable energy storage could allow flexibility in demand and balance out energy system needs in the future.

It is estimated that by 2020, 10 per cent of new cars purchased will be electric cars. Due to limited availability, electric cars will constitute only a small share of the vehicle fleet and vehicle mileages in 2020, and will have very little impact on the climate objectives for 2020. Nevertheless, if we are to reach the goal of cutting greenhouse gas emissions by 80 per cent by 2050, a greater share of the vehicle fleet must consist of electric vehicles and carbon-neutral energy production must be increased.

According to a 2011 study, the introduction of electric cars is unlikely to present a major challenge for energy production capacity. A million electric cars – a number that will only be reached by 2030 at the earliest – would use approx. 4 TWh of electricity, which is less than 5 per cent of the current total energy consumption in Finland. By intelligently organising the recharging of electric cars, power spikes can be avoided and the need for additional power minimised. The large-scale use of electric cars would affect local networks the most.

Intelligent recharging systems will not be the only ITS solution in electric cars. Other possibilities include monitoring car charging needs, locating car charging facilities, reserving charging and parking spots, using various identification methods, etc. Combined with other ITS solutions, electric cars and intelligent car recharging systems have the potential to form an integrated whole that is able to respond to the challenges posed by climate change, congestion, and the safety issues of the current transport system.

4.9 Innovation and piloting programmes for intelligent transport

The ITS sector is innovation-centred, with new product and service ideas being created constantly. One of the sector's main challenges is innovation process management, i.e. how the innovation process can be speeded up. Various solutions (e.g. living lab, test bed, test site, FOT – Field Operational Test and ELSA - European Large

Table 19. Intelligent electric transport projects

Main actions	Coordinator + participants	Timetable
Improve the coordination of intelligent transport and electric transport and identify the main synergies of these two industries. The goal is to identify common interests and strengthen implementation cooperation.	MinTC, MEE , FTA, TraFi, ITS Finland, TEKES, research institutes, corporate sector	2013–2015
Assess the compatibility of the goals and results of the multi-service model project with the plans for an electric vehicle charging interoperability operator. Finnish energy companies are introducing a system that will allow the interoperability of electric car recharging systems. Operators will also provide interfaces for billing and third party services. Similar functions have been considered for the transport multi-service model.	FTA , MinTC, MEE, TraFi, ITS Finland, research institutes, corporate sector	2013–2014
Assess the potential of vehicle solutions associated with fair and intelligent transport pricing in the electric transport sector. In the event that the transport pricing system is revised, ensure that the low emission levels of electric cars are taken into consideration when defining the mobility pricing parameters.	MinTC , MEE, MoF, FTA, TraFi	2013–2017
Promote the implementation of the Future Propulsion Technologies in Transport working group's recommendations. Participate in TEKES's EVE – Electronic Vehicle Systems Programme 2011–2015.	MinTC, MEE , FTA, TraFi, ITS Finland, TEKES, corporate sector	2013–2017

Scale Action) have been tried out at the EU level.

There are many high-quality transport and infrastructure information resources in the Ministry of Transport and Communications' branch of government. These resources are managed by the Finnish Meteorological Institute, the Finnish Transport Agency, the Finnish Transport Safety Agency and the Finnish Communications Regulatory Authority. By enabling the open use of information resources, private stakeholders

will be provided with the raw materials for creating innovations and services. The release of open data will support the development of new services and the creation of new business. The openness, efficiency and interoperability of administrative operations will also be improved.

The objective of intelligent transport testing and implementation areas is to bring together the public and private sectors and researchers to brainstorm, innovate, pilot and evaluate new intelligent transport solutions.

Table 20. Intelligent transport innovation and piloting programme projects

Main actions	Coordinator + participants	Timetable
<p>Implementation of large-scale combined testing and deployment pilots</p> <ol style="list-style-type: none"> 1. Encourage the full-scale exploitation of the potential offered by the growth corridor project along the E18 by using ITS services. Investments in the E18 growth corridor and Finland's physical location between the EU and Russia provide a rare opportunity to test and implement ITS ideas. Continue to identify and carry out FITSRUS project pilots and further develop cross-border cooperation with Russian intelligent transport operators. Aim to utilise EU funding in ITS service projects along the corridor. 2. Integrate ITS trials into urban traffic management operations. Special emphasis is placed on large urban areas through e.g. the programme on key transport management projects in the Helsinki metropolitan area and the Tampere region's ITS Factory 3. Standardise and brand Finland's ITS framework for use in domestic and international R&D investments and trials. Highlight the high quality of training and research in this field, information and communications technology expertise, and the potential of open data. 	<p>FTA, MinTC, TraFi, FMI, ITS Finland, municipal sector, research institutes, corporate sector, ELY Centres / VALTTI</p> <p>International partners</p>	<p>2013– 2017</p>

Main actions	Coordinator + participants	Timetable
<p>Enable and promote services based on open data</p> <ol style="list-style-type: none"> 1. Implement a transport data marketplace by emphasising the description and opening of existing transport database interfaces. Pay special attention to information services that benefit intermodal cooperation. Assess the possibility of integrating the transport data window into the National Land Survey's Map Window. Release free, exploitable transport data and grant third parties extensive rights of use. 2. Promote the utilisation of open data by organising competitions, such as the HSL Mobiilikisa and Apps4Finland. Promote the use of open data-based services by issuing reports and by linking the services with those in the transport data window. Activate app developers and establish a developer community. Make community participation in open data competitions a permanent practice. 	<p>FTA, MinTC, TraFi, FMI, ITS Finland, National Land Survey of Finland (NLS), municipal sector, research institutes, corporate sector</p> <p>Open data application developers</p>	<p>2013–2017</p>
<p>Implement a systematic monitoring, evaluation and deployment programme for advanced ITS services.</p> <ol style="list-style-type: none"> 1. Commercial stakeholders and user communities already produce solutions and services, the extensive use of which would support the achievement of the transport policy objectives. However, the distribution, further development and final release of services onto the market often takes a long time and requires significant resources. Make a survey of existing available services in cooperation with ITS Finland and draw up descriptions and impact assessments of the advanced services. Provide information about the services and their inherent potential. 2. Launch a development programme to develop, evaluate and internationalise ITS services. The programme will exploit the findings of the national FINTRIP project and its developmental requirements will be defined in conjunction with travellers, companies that require services, service providers, and intelligent transport stakeholders. 3. Carry out systematic monitoring of domestic and international market sizes and trends. 	<p>FTA, MinTC, TraFi, ITS Finland, FMI, municipal sector, research institutes, corporate sector</p>	<p>2013–2017</p>

Main actions	Coordinator + participants	Timetable
<p>Exploit the opportunities offered by the ITS Europe 2014 Congress</p> <ol style="list-style-type: none"> 1. Launch a joint project with the Ministry of Transport and Communications' administrative branch, TEKES and other leading Finnish innovation organisations. The objective is to implement a top-of-the-line ITS service package for Congress participants. The services should also be available for export. 2. Activate other administrative branches, the municipal sector and businesses to make the ITS Europe 2014 Congress a national Smart City showcase. 	<p>MinTC, FTA, TraFi, ITS Finland, FMI, municipal sector, research institutes, corporate sector, MEE, TEKES, ELY Centres / VALTTI</p>	<p>2013–2014</p>
<p>Participate in electric car pilots in order to obtain the synergies of intelligent and electric transport.</p>	<p>MinTC, MEE, FTA, TraFi, ITS Finland, municipal sector, research institutes, corporate sector</p>	<p>2013–2017</p>

5. Realisation of the Second Generation Intelligent Strategy for Transport



The Second Generation Intelligent Strategy for Transport is based on the implementation of end user requirement-based key projects through advanced solutions that bring added value.

The implementation programme combines research and development, a procurement policy that encourages innovation, and a progression from trials to final implementation. The implementation is based on the PPP principle.

The aim of the implementation programme is to initiate and enable the large-scale exploitation of ITS tools and the creation of market-driven services. The programme will help to integrate ITS methodology into transport system planning and operations systematically.

5.1 Intelligent transport research & development

The intelligent transport R&D will focus on intelligent operating models, technologies and services for passenger and goods transport chains, and transport predictability, punctuality and capacity optimisation measures that aim to ensure optimal use of the transport system.

The collection, processing and open distribution of information on mobility and transport system status will be of utmost importance. It will be vital to identify cost-effective methods that can be used to exploit the potential of communal mobile data production and distribution to the fullest.

The aim is to identify the ITS services that will most efficiently advance the realisation of the Government's new transport policy. Identification of these services will be possible by investing in predictive impact assessment of actions and services, test-based research,

and advances in cross-administrative impact awareness. It is important to focus not only on predictive research, but also on evaluating solutions that are implemented in order to identify best practices and to develop these solutions further.

Research and development resources will primarily be allocated to joint sector projects. FINTRIP's network projects, such as Smart City, and R&D projects associated with national intelligent transport implementation areas and corridors are examples of such projects. It is vital that the opportunities for Finnish ITS companies brought by the ITS Europe 2014 Congress in Helsinki be fully utilised.

5.2 Precommercial procurement

A common problem with public purchases is that the procurement procedures do not sufficiently support corporate innovation activities or the provision of innovative solutions. Current procurement practices steer the central government and municipalities primarily towards purchasing existing solutions, rather than asking for new approaches. A precommercial R&D procurement method will be actively introduced in order to link together the needs of society and the innovation potential of businesses.

It will be possible to use precommercial R&D procurement to promote the use of new solutions to solve development needs in society by exploiting the innovation potential of businesses and simultaneously creating an incentive system to encourage commercialisation.

5.3 Organisation and monitoring of implementation

The key projects of the Second Generation Intelligent Strategy for Transport are joint projects carried out by transport administration stakeholders. In these projects, the public sector is a client and enabler, and the private sector is primarily responsible for the actual technical implementation.

Each key project will have a responsible organisation, a steering group and a project manager. In early 2013, an intelligent transport strategy coordination group consisting of representatives of the main responsible stakeholders was established. The coordination group will monitor the implementation of the Second Generation Intelligent Strategy for Transport and its programmes and will coordinate the key projects.

ITS should be more fundamentally integrated into the development of all transport modes and infrastructure and the entire transport system. In the major urban areas, it will be essential to ensure a linkage with the MALPE letters of intent and regional transport system cooperation. This will be handled by traffic management steering groups that are experts in dealing with interjurisdictional and cooperative actions.

The Ministry of Transport and Communications is in charge of implementing the strategy and is responsible for allocating sufficient resources to it within the transport administration sector. In accordance with the strategy's operating model, its partners are the private sector, other authorities, intelligent transport users and other stakeholders. The Ministry is responsible for establishing intelligent transport as a central transport policy tool, and for creating a good operating environment for intelligent transport solutions through appropriate legislation and communication.

Other Ministries will support the implementation of the intelligent transport strategy in their respective sectors, participate in cooperation at all administrative levels, and draw up legislation that will help develop a viable operating environment for intelligent transport. Each Ministry will draw up its own intelligent solutions strategy.



The national Intelligent Transport Advisory Board (2010–2012) assisted the Ministry of Transport and Communications in steering the implementation of the strategy and in preparing national guidelines e.g. for the European Union. When the board's term ended in late 2012, its transport policy management duties were taken over by the New Transport Policy Forum. The board's project-related duties, such as the monitoring and coordination of the development of the key projects, became the responsibility of the newly-established **Intelligent Transport Strategy Coordination Group**. The advisory board's communication policy-related duties were taken over by ITS Finland.

The New Transport Policy Forum (2012–2015) aims to ensure that transport policy is purposefully drafted in a way that promotes new types of customer-oriented operations and a culture of collaboration. It also aims to find new ways to improve the productivity and impact of transport policy and to promote the efficient use of innovations and new technology.

The Intelligent Transport Strategy Coordination Group (2013–) assists the Ministry of Transport and Communications in steering the implementation of the strategy and in preparing national guidelines e.g. for



the European Union. When it was founded in spring 2013, the coordination group took over the national Intelligent Transport Advisory Board's operative tasks, such as the monitoring, coordination and impact assessments of the key projects.

Under the guidance of the Ministry of Transport and Communications, the Finnish **Transport Agency** is responsible for implementing the intelligent transport strategy in its sector and for guiding Centres for Economic Development, Transport and the Environment (ELY Centres) in implementing the strategy. The Agency is also in charge of ensuring the availability of services in major urban areas and continuity across administrative boundaries, and is responsible for the overall intelligent transport architecture.

Under the guidance of the Ministry of Transport and Communications, the Finnish **Transport Safety Agency TraFi** is responsible for implementing the intelligent transport strategy in its sector. TraFi places particular emphasis on ITS-related register and information services and on using ITS tools to create safety and environmental impacts.

Under the guidance of the Ministry of Transport and Communications, the Finnish

Meteorological Institute is responsible for implementing the intelligent transport strategy in its sector. The Institute will invest heavily in the production of traffic condition information, particularly weather and road surface condition information.

Under the guidance of the Finnish Transport Agency, the **Centres for Economic Development, Transport and the Environment (ELY Centres)** are responsible for implementing the intelligent transport strategy in their respective administrative branches, while cooperating with other regional stakeholders.

Under the guidance of the Finnish Transport Agency, **the National Transport Telematics and Information Services unit (VALTTI)** is responsible for planning, maintenance and procurement activities associated with roadside technology and transport management information services in the areas of all ELY Centre jurisdictions.

ITS Finland acts as an advisory community of experts, which represents its members in implementing the strategy and – in cooperation with other stakeholders – monitors international developments and keeps its sector well-informed on these developments. ITS Finland promotes the globalisation efforts of its members – and

particularly of small and medium-sized companies – through the ITS Europe 2014 Congress and export network activities.

The Finnish Funding Agency for Technology and Innovation (TEKES) acts as a strategic partner of the administrative branch in all R&D associated with the development of products and services. It also ensures that the needs of intelligent transport are taken into consideration in all of TEKES's own programmes and in the Strategic Centres for Science, Technology and Innovation (CSTIs). TEKES particularly encourages corporate-driven product and service development and globalisation.

Strategic Centres for Science, Technology and Innovation (CSTIs) offer high-level research units and enterprises that exploit research findings a new way of collaborating with each other tightly and according to long-term plans. The most important strategic centres for the realisation of the intelligent transport strategy are the information and communications industry centre, TIVIT, and the built environment centre, RYM Ltd.

The business sector produces and exports commercial intelligent transport services and products, which it also actively utilises in its own business activities.

The municipal sector is in charge of the implementation and municipal-level development of the intelligent transport strategy, and ensures the cross-border continuity of services. Key forms of cooperation include regional MAL and MALPE letters of intent, regional transport system letters of intent and regional transport management cooperation groups. The regional cooperation organisations in the municipal sector play a key role in the development of more wide-scale forms of cooperation that function across municipal borders. The most significant of these is the Helsinki Regional Transport Authority (HSL/HRT), which has ensured that the development and implementation of intelligent transport solutions forms an essential part of regional transport system development.

Educational and research organisations in the transport sector are responsible for integrating ITS with basic education and research in their substantive areas. In accordance with their operating plans, the research institutes will participate

in ITS research projects and play a key role in the production of information for decision makers and service providers. The expertise to be found at universities and polytechnics should particularly be exploited to test the functionality and assess the impacts of new innovations.

ITS Factory is an innovation, testing and development environment for ITS, which utilises PPP to look for solutions for the challenges posed by increasing traffic volumes. The objective of the PPP is to make the Tampere region a nationally and internationally significant ITS test area. The transport environment is of an ideal size and the area is home to many potential collaborators in the field of intelligent transport solution, product and service development.

5.4 Funding for implementation of the Intelligent Strategy for Transporty

In recent years, the administrative structure of the transport sector has been reformed with the intention of moving away from infrastructure- and sector-specific approaches and towards transport system-level systemic thinking. The change has been supported by the Transport Revolution programme, and the shift in thinking is visible in the Government's Transport Policy Report and new transport policy. The shift has also affected funding; it is increasingly difficult to separate ITS funding from other transport administration funding. Intelligent transport is defined as the utilisation of information and communications technology in transport. Thus, all traffic management and control systems and their background systems could be considered to represent intelligent transport. In particular, the increased exploitation of remote and virtual services and open data have introduced ITS into contexts that were never thought about when the intelligent transport market was originally defined.

Funding for the projects will come from a variety of sources. All transport sector stakeholders will participate in the funding, with transport administration representatives shouldering most of the responsibility for it. However, strategy implementation calls for other stakeholders besides the State –



such as businesses, municipalities and cities, the Finnish Funding Agency for Technology and Innovation (TEKES) and end users – to participate in the financing. The aim is to help realise the EU White Paper’s “user pays” and “polluter pays” principles in stages.

The Finnish annual ITS market volume is estimated to be approx. EUR 300 million. Public sector projects currently account for the vast majority of this. Annual public sector investments in ITS come to approx. EUR 200 million, two thirds of which is from the State. The total consists of administrative investments and maintenance costs, the cost of renewing traffic control systems, railway safety equipment, the main transport sector registers and information systems, and transport sector R&D.

It is difficult to clearly separate the annual budget for implementing the Second Generation Intelligent Strategy for Transport from the funding for other associated activities, but it is estimated to be an annual total of approx. EUR 40-60 million. All projects will be realised within the budgetary framework. The budgeting of individual projects is coordinated by the Intelligent Transport Strategy Coordination

Group. Project assessments and budgets are drawn up at the same time as the project implementation plans.

The cost of the key projects totals approx. EUR 300 million in 2013–2017 and will be covered by the different stakeholders as follows:

■ central government	EUR 215 million
■ municipalities	EUR 20 million
■ businesses	EUR 30 million
■ users	EUR 35 million

In the 2013–2017 national budgets, public funds are allocated to government agencies in the Ministry of Transport and Communications’ branch of government for strategy implementation. Other stakeholders will participate in the funding of ITS through the key projects and on the basis of their own goals and resource frameworks. The other stakeholders’ annual investments in the ITS sector total approx. EUR 50 million, two thirds of which will be allocated to the strategy’s key projects. In this same period, State funding for ITS will be equal to just 4 per cent of the funds allocated towards transport infrastructure maintenance if the infrastructure maintenance budget stays at the 2012 level.





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