Ministry of Transport and Public Works

Telematics in the Transport Sector

An exploration of its potential

The computer is proving to be a multifaceted partner in the world of transport, as in other fields. It is indispensable for solving old problems and providing new services.

Telematics - computers with remote control - is making heavy demands on our adaptability. It is not something we can leave to a handful of enthusiasts. If the Netherlands wants to continue to play a major role in international transport, more people need to be involved in promoting interest in telematics and advancing our knowledge of the subject.

The Ministry of Transport and Public Works has explored the field and established priorities. This booklet presents the results. It is our hope that it will inspire many people in this sector to make their voices heard. Even the best computer cannot do it alone. People are needed to give direction and make adjustments where necessary.

The Minister of Transport and Public Works,

J.R.H. Maij-Weggen

Telematics in the transport sector

What we want is bordering on the impossible. We want a significant proportion of traffic to and from Europe to continue to pass through the Netherlands in the future. But at the same time we want to put an end to congestion and environmental degradation.
The new Structure Scheme for Traffic and Transport issued by the Ministry of Transport and Public Works explains how the government intends to reconcile mobility with the quality of life. The plans involve a great deal of telematics. In fact, telematics would seem to be a substitute for asphalt and concrete.

Will telematics really be able to guarantee mobility? The official Telematics Working Group within the Ministry of Transport and Public Works has examined the role played by telematics in the transport sector, and has considered what the Ministry can do in this field.*
This was no easy matter, since many applications of telematics still exist only on paper.
It can therefore be concluded that although telematics offers tremendous possibilities, a great deal of thinking and technological development are required before we shall be able to use them as a matter of course. The Ministry of Transport and Public Works should play an active role in this regard.

If you want to talk about telematics, familiarity with a great deal of technical jargon is helpful, though it is not an absolute necessity. Nor does it provide a guarantee that the speaker knows what he is talking about. For those who have no idea what telematics is, it can be summed up in two sentences. Those who enter information into a computer are involved in technology. And those who do it from a distance, via telecommunications, are involved in telematics.

Sometimes people are involved in telematics without knowing that is what it is called. Telematics simplifies our work, enables us to take on more than we used to be able to, and above all, IT MAKES POSSIBLE THINGS WHICH USED TO BE INCONCEIVABLE. For instance, the Structure Scheme for Traffic and Transport argues that in the 21st century the use of telematics will make possible a completely new type of motorway, which will be programmed exclusively on the basis of sound decisions. And a whole new world of possibilities will be opened up if text, images and sound can travel rapidly via the same network and can be combined according to requirements.

*The complete report entitled 'Telematics in the Transport Sector', on which this booklet is based, can be ordered by phone from the SDU-publisher: 070 - 3 78 98 80

Telematics can find numerous applications in the field with which the Ministry of Transport and Public Works is concerned. These applications are listed in the report, which constantly endeavours to provide information on the current state of affairs, on problems and prospects. The role which the Ministry of Transport and Public Works might play was also examined in the light of current policy. The categories used have been kept practical.

The key element in each of the applications of telematics is the function; the working group asked itself what telematics is used for and established its classification system on this basis. Six categories can be distinguished:

1 *Route planning*
2 *Traffic control*
3 *Enforcement/monitoring*
4 *Freight management*
5 *Market mediation*
6 *Substitution*

These categories are explained in the sections that follow.

The report states which applications of telematics are the most useful for policy purposes. The Ministry of Transport and Public Works should focus on these main elements. This selection will lead to projects and campaigns which can all be launched within two years.
No one harbours the illusion that these main elements are a sort of blueprint for the society of the future; they involve small, practical steps in the direction indicated in the Structure Scheme. The views of numerous 'key figures' were sounded out during its preparation, and their contributions, too, were drawn on in this exploratory study. In addition new interviews were held to assess the report in the light of the current situation.

When people talk about telematics in the transport sector, they are referring in nine cases out of ten to RTI (Road Traffic Information) or EDI (Electronic Data Interchange). EDI involves the direct exchange of data between one computer and another which are called up in an agreed manner, giving rise to what may be called 'structured messages'. These messages are transmitted via the cable or by radio often via a network which offers extra facilities.

The Ministry attaches great importance to telematics in many respects. Telematics can help agencies in their own work, but can also be used to eliminate the inconvenience caused by traffic. Furthermore in the transport sector, which the Ministry of Transport and Public Works wishes to promote, it leads to product improvement all across the board.

The interviews with 'key figures' reveal that a great deal is expected of the government:

...The Ministry of Transport and Public Works should show greater interest in the whole field of telematics and technological innovation;

...civil servants should endeavour to bring their knowledge up to date;

...the government should tackle matters in a less fragmented manner by modifying its own organisation.

Route planning

As the name implies this involves systems which enable travellers to make a sound choice of route and means of transport, or information which enables people to find the best route, depending on the circumstances.
Such systems are useful for policy purposes. They make public transport, which some people have problems with, more readily accessible. And they can prevent people from getting caught in a traffic jam unsuspectingly. The capacity of the road network is utilised more effectively and people are spared irritation.
People often ignore public transport, because the relevant information is available only in a fragmented manner.

When roads are involved, *route planning* and *traffic control* overlap. The main role in route planning is played by road-users, while in traffic control it is played by road authority.
To make a sound choice of a route, however, motorists require the same up-to-date information as the road authority does for traffic control. This means that the equipment which provides information on the current state of affairs on the road network (i.e.monitors) serves both purposes.
The same applies to communication with vehicles. The interests of government and industry should therefore be linked in this respect.

Prospects

To enable the infrastructure as a whole to be utilised effectively, information about timetables, routes and prices should be readily accessible to road-users and travellers. Up-to-date information on congestion and alternative routes is particularly important. It should be possible to modify plans en route.
The public transport system in the Netherlands is currently establishing a computerised traveller information system, starting with information on train and bus timetables. This will be followed by up-to-date information on congestion and diversions.

Road traffic also benefits from up-to-date information on the traffic situation and alternative routes. It is expected that the on-board equipment in cars will soon be designed to receive messages from the 'road authority', which will be transmitted by beacons. One of the principal effects of this is expected to be an increase in capacity in urban areas. But the introduction of dynamic route information will also enable motorways to carry 10% more traffic.
Route planning and traffic control are fully in keeping with the policy which has been outlined. Therefore there is every reason for the Ministry of Transport and Public Works to encourage activities in this field.

Travellers should be able to obtain information about travelling times and expenses, congestion and alternative routes at any time, at home, en route or wherever they may be, via a 'multimodal' system, a system which provides information on everything from superfast trains to the hiring of bicyles.
The Ministry of Transport and Public Works will make traveller information a MAIN ELEMENT.

Traffic control

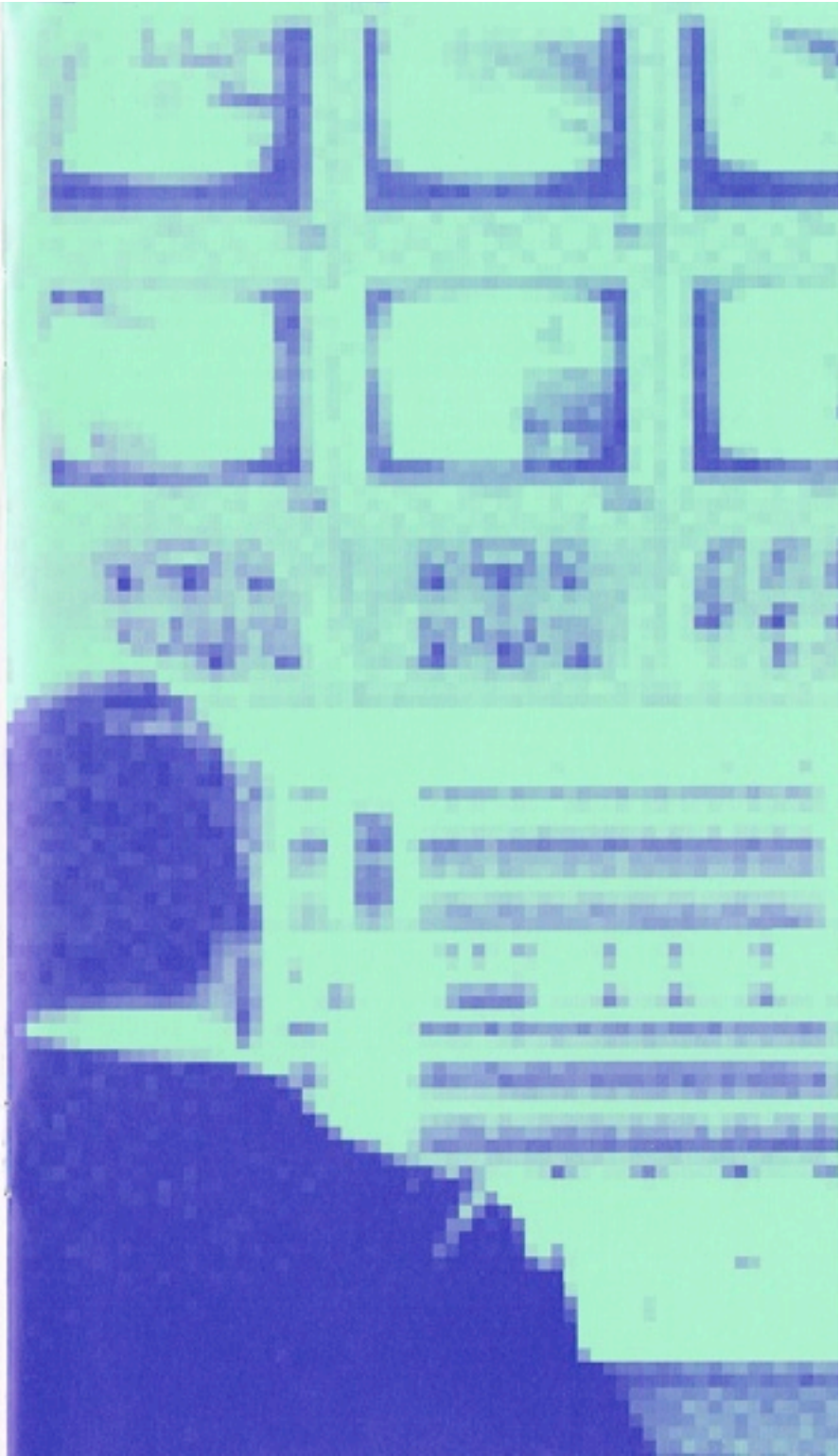
Traffic control involves communication with vehicles or vessels for the purpose of providing instruction or advice. It aims to ensure efficient use of the infrastructure and guarantee safety. No human messenger is required for road signalling, with its programmed recommended speed limits.

Road Pricing, in so far as it aims to price part of the traffic of the market, is also a form of traffic control. As a road authority, the Ministry of Transport and Public Works is directly responsible for the quality of the system (speed, safety, comfort). Route planning and traffic control can make a major contribution in this regard. Road traffic control systems are still in a stage of development, however.
The Ministry should formulate the standards and requirements which the hardware should meet. The intention is to use European standards.
Links with other systems, such as public transport, should remain open.

The main task as far as the Ministry of Transport and Public Works is concerned, is to encourage national applications and take part in large-scale international research.
We should not dissipate our efforts on a few major technological stunts, but work step by step on a coordinated system. Priority should be given to the major transport axes and significant bottle-necks.

It is in the field of traffic control that the most futuristic perspectives which telematics offers in this sector are encountered. And yet such a future is not that far away, and governments and companies are investing billions in the projects concerned. A well-known aim of European countries is also to destroy technical barriers and to pool their expertise to keep Europe in the race. The enchanting name for these efforts is Eureka.

The Eureka projects in the field of transport are a dream come true for young people with a scientific background. The aim is to build intelligent vehicles which communicate with each other and with the infrastructure, and to enable drivers and passengers to remain in contact with the whole world, and in particular with their 'base camp'. The european motor industry has set out to improve cars' IQ, an exercise called *'prometheus'*. In the meantime, governments are investigating what the specifications for infrastructure will need to be in the next century. Their banner reads DRIVE.



These and other projects are not isolated from one another, but are interlinked. The ultimate aim is to arrive at an integrated transport system, which has been given the code name RTI. Intelligent cars will convey the passengers - one can hardly call them 'drivers' - to their destination along intelligent roads. And if congestion threatens, they will stop 'just in time' at the transfer point (the station).

The preliminary projects relating to this metamorphosis of high-speed transport require billions. Few people, including those at the Ministry of Transport and Public Works, realise what awaits them. For many years pilots have been flying under guidance. And the real train driver does not sit in the train but behind the control panel. In the case of cars, the situation is just about the same as what is was before the war. If appearances are not deceptive, this situation is coming to an end; motorists are gradually becoming computer controlled.

As far as aviation is concerned, traffic control has been taken for granted for many years and the current system is to be replaced by a new one (SARP-2). In addition, Eurocontrol and EC Member States are trying to harmonise procedures so that everyone has access to the same, up-to-date radar data. Internationally, the ICAO has approved the MLS-system which will enable pilots to land without lights and to turn during their approach runs.

Traffic control in the field of shipping is also changing. Traffic departments are gradually obtaining more information about the position of ships, and radar data are being linked to systems in which other information about ships and their cargo is stored. Following the introduction of a new system, it will be possible to establish the exact position of ships throughout the North Sea. On a global scale, the Netherlands is encouraging the establishment of a public ship-location system, which is to be managed internationally. This will lead to a tremendous improvement in the safety of shipping.

The Ministry of Transport and Public Works acts as manager of an information system for the main shipping routes, which ensures a smooth movement of shipping at the location of hydraulic engineering works. Inland shipping, too, must povide consignors with assurances about the length of journeys. The Public Works Department wants to limit the delay at locks and bridges to no more than 30 minutes in the future. An additional advantage is that inland shipping only has to specify the name of the ship and its cargo once for the whole journey. It will also be possible to devote particular attention to special transport (push-tow navigation with six-barge units).

Regulation of road traffic improves both mobility and safety, as well as enhancing the quality of life. That is why the ministry of Transport and Public Works is making it a MAIN ELEMENT. The principal transport axes will be dealt with first.

Enforcement and monitoring

The government plays a central role in this application of telematics. The Ministry of Transport and Public Works will concentrate on the carriage of dangerous substances and checks on driving and rest periods, as well as focusing on the need for a registration number system.

In this field, too, prospects are looking good. The government's activities in the field of monitoring in the tranport sector are rather primitive. A few vehicles are stopped occasionally and it is established, with some difficulty, whether the carrier is observing the rules. In the future experts foresee the introduction of an on-board computer which will record not only driving and rest periods but also numerous other data which are of relevance for management purposes.
The government and the business community have a common interest here. Both partners are therefore involved, together with industry, in the development of equipment which can serve many interests, including those of drivers, who will have fewer worries. The potential of an on-board computer can be fully utilised only if it replaces the tachograph which is currently required by law - an inaccurate device which is open to abuse.
The business community in the Netherlands is playing a pioneering role in this regard, a fact which should be used in international consultations. In the short term, it will be possible to simplify driving period inspections by giving the inspectors a 'field memory', which will render a great deal of paperwork superfluous.

Applied telematics will also play a major role in the carriage of dangerous substances. As in inland shipping, developments are moving in the direction of a reporting and tracking system for substances which require extra attention, such as hazardous waste and radioactive material.

New techniques make it possible to keep continuous track of consignments and to maintain contact by means of mobile communication. This facilitates inspections and provides more to go on in the event of disasters.
An on-board computer will prove most effective if it benefits all parties concerned. Running modern transport undertakings requires a wealth of management information. If this need is met, industry will be able to take account of the rules governing the transport of hazardous substances without any difficulty. But at the same time, electronic infrastructure along the roads (IRTE) must also be tailored to the needs of industry. Carriers and inspectors can then use the same network.
Prospects are favourable enough to carry out tests on a significant scale over the next few years.

The Ministry of Transport and Public Works believes that telematics can play a major role in the performance of its inspection duties. 'Tracking and tracing' and on-board computers will be introduced in inland shipping and road transport. This therefore constitutes a main element, and will benefit both government and industry.

Freight management

Freight management constitutes a radical application of telematics in the transport sector.
The physical movement of goods is inconceivable without the transfer of information. Those involved in logistics are, by definition, involved in communication.
The fact that telematics makes it possible to gradually replace paperwork by electronic messages, will revolutionise the world of transport.

Documents and goods will no longer travel from one destination to the next separately, with personal inspections at each intermediate point. Instead, the electronic 'consignment note' will travel on ahead. The state of affairs at any particular moment can be continuously monitored at each link in the transport chain. No one has to chase after the facts any longer; it is possible to anticipate what is to come. Furthermore, electronic messages can follow a different route than the physical cargo.
The Netherlands, which has traditionally controlled significant goods flows, also wants to exercise a controlling influence as far as transport information is concerned. It is not necessary for all the goods to pass through the Netherlands, but it is important where the strings are pulled.

Tracking and tracing techniques enable constant tabs to be kept on every shipment. The more rapid procedures and guaranteed delivery times mean that fewer reserves are required and entrepreneurs can save costs on stock formation.
Transport will become precision work. And the control of the logistic process will help determine quality. Transport will become a reliable link in the production chain, or will form an inseparable part of the distribution process, depending on how you look at it.

The introduction of telematics in the field of freight management is the responsibility of industry, and in particular, suppliers and users. But, the general opinion is that the Ministry should also play a part. The use of EDI is of stategic importance for a country which occupies a major role in distribution. The government must therefore do what it can to eliminate bottle-necks, and support all worthwhile schemes. The role of the government could involve information, research, standardisation and funding, and if necessary, legislation.

The government is, of course, also involved in the infrastructure. The Netherlands has opted for a liberal policy in that regard. The cables belong to the PTT, but that is where its monopoly ends. There is a free market for terminal equipment and services, and this will reduce prices and enhance the quality of telematics.

In addition, the government should create frameworks for mobile communication. Electronic contacts between firms and vehicles will be indispensable for planning and management purposes.

The Netherlands must be careful not to miss the boat. The Ministry of Transport and Public Works will therefore propose that all interested parties should jointly form a Steering Committee on Mobile Communication.

There are still quite a few obstacles to the 'telematisation' of the transport world: insufficient knowledge, lack of cooperation, shortage of funds. But the greatest handicap seems to be the lack of standardisation. In that regard, the government must bring its heaviest guns into play. The Ministry of Transport and Public Works intends to give vigorous support to consultations on standardisation. These consultations are held in EDIFORUM, and thus on transport in the UTC subgroup. The Ministry intends to make money and manpower available, in consultation with the Ministry of Economic Affairs, which carries overall responsibility for this matter.

Everyone is convinced that
the 'telematisation' of transport in
the Netherlands is an absolute necessity.
And yet there are still many problems.
The Ministry of Transport and Public Works
wants to tackle this matter by means of
information and standardisation.
But from a distance, by lending support
to specialised organisations.
This therefore constitutes another
MAIN POLICY ELEMENT.

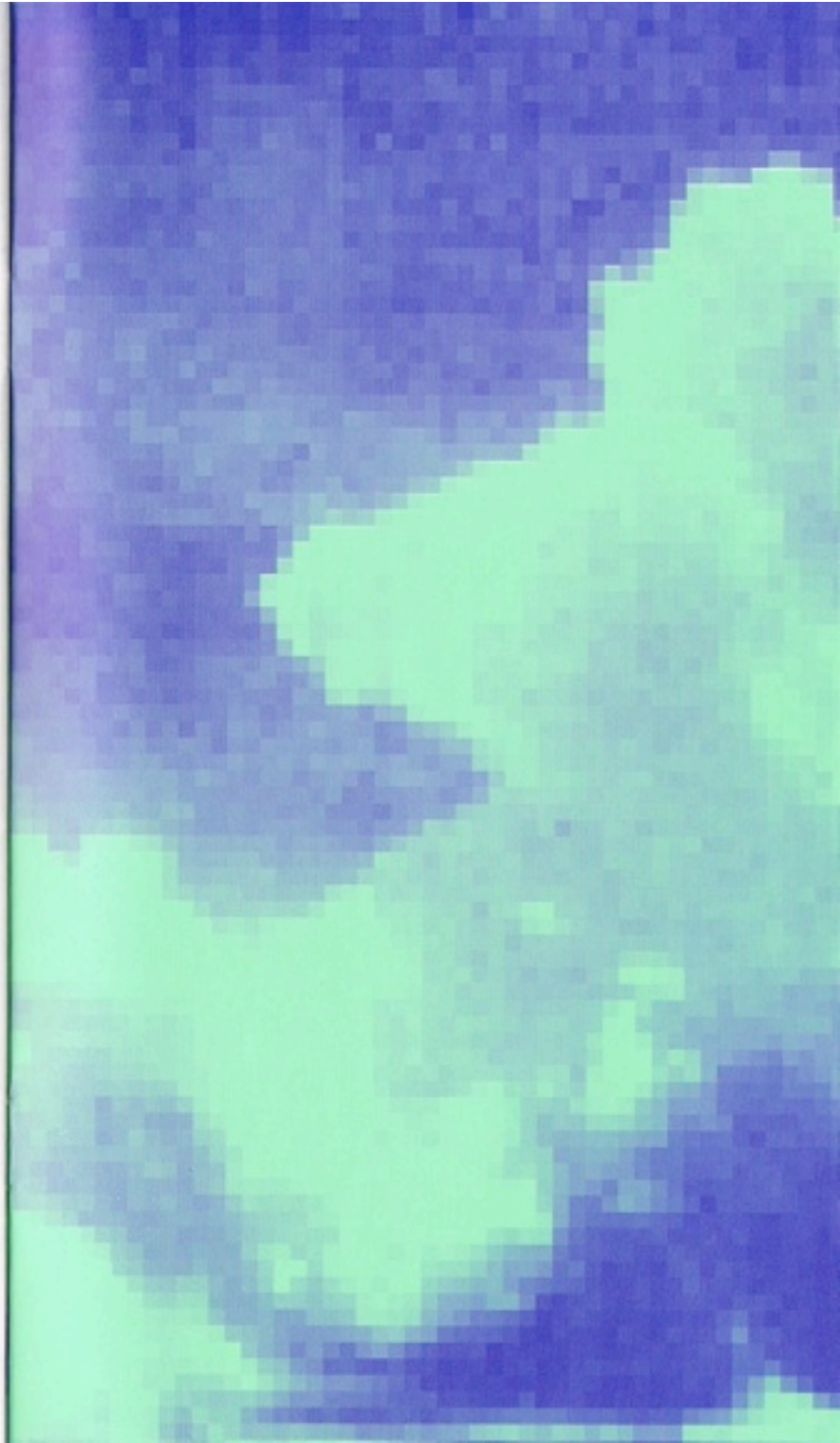
Other main elements

So far the priorities set (MAIN ELEMENTS) have covered specific applications of telematics in the transport sector.
But there are also several other things that need to be examined in the field of telematics.
Three of them are mentioned below:

■ The Ministry of Transport and Public Works wants to make better use of telematics in its own sphere of work, by improving the exchange of information between the Ministry and its contacts and associates. It is believed that 'clients' will be assisted if all kinds of databases are made accessible to the outside world, just as the police are already allowed to use the Veendam vehicle registration database. It will certainly be worthwhile putting an end to all the confusion in electronics both internally and externally. This would enable the amount of paperwork involved in a process such as licensing to be reduced.

■ We have already seen what telematics can mean for the efficiency and quality of goods transport. But the situation is no different in public transport, where a new approach is also possible. An approach which concentrates on one transport technique or one undertaking less than is currently the case.
If the patterns of traveller movements are taken into account and transport to the departure point and from the arrival point is not forgotten, the results arrived at are completely at odds with current practice. It would seem to be possible to provide a public transport system which is more tailored to demand and can react more flexibly to incidental events.
The Ministry of Transport and Public Works will vigorously support efforts in this direction. Promoting introduction of logistical concepts of sufficient scope will therefore be a main policy element.

■ As already mentioned, a great deal of money is being invested in research into telematics in the transport sector.
The Netherlands is insufficiently involved in this. Top priority will be given to ensuring that the participation of Dutch companies and organisations is increased, and greater stress should be placed on this matter in Brussels. This is therefore a MAIN POLICY ELEMENT.



A publication of the
Ministry of Transport and Public Works,
Information Department

The Ministry of Transport and Public Works
has a telematics centre.

If you have any questions or would like further information, please contact:

Mr. D.H.van Egeraat
Central Information Bureau Telematics Traffic and Transport
Plesmanweg 1-6
2597 JG The Hague
Telephone 070 - 3 517361
Telefax 070 - 3 517895

Design:
Dijkerman & van Waarden (Jacquelien Groot), The Hague