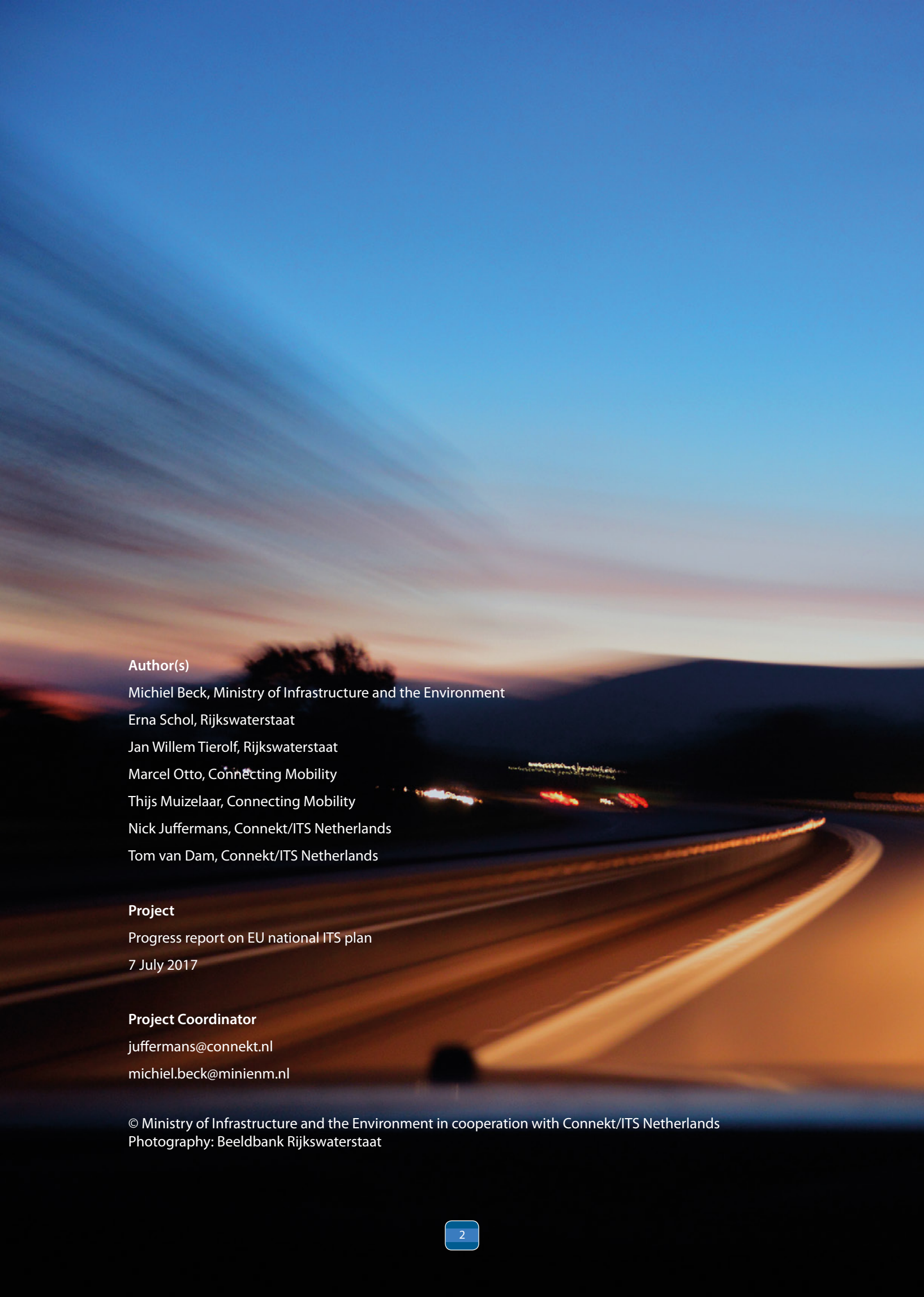Ministerie van Infrastructuur en Milieu

ITS in the Netherlands
Progress Report 2014 - 2017

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Introduction

This report has been drawn up within the framework of the European ITS Directive (2010/40/EU), under which Member States are required to submit reports at certain moments. On the basis of Article 17 of the Directive guidelines have been adopted on the form that these reports should take. This report is a follow-up on the progress report previously submitted to the European Commission in 2014 and the document 'ITS-Plan the Netherlands 2013-2017' submitted in August 2012.

The rapid pace of innovation within the field of ITS has prompted us to change the structure of the progress report. In this document we therefore report for the first time, and to the extent possible, on ITS KPIs agreed at European level. The progress reports for priority actions B, C and E have also been incorporated into this report.

To provide a good insight into the progress made in the area of ITS in the Netherlands, we have once again selected a number of interesting projects and services that are being implemented or have been completed over the 2014-2017 period. Consideration has also been given to the potential value of these projects for other European countries.
In an attempt to ensure this report is informative yet concise, we have focused mainly on presenting facts, figures and images.

STRUCTURE

Chapter 1 describes the progress made in implementing the EU ITS actions in the Netherlands. These actions are contributing to the compatibility, interoperability and continuity of ITS solutions across the EU and are also complementary to the Dutch ITS Strategy.
Chapter 2 contains an introduction outlining the progress made in the area of ITS policy in the Netherlands, including the progress of the national programmes Beter Benutten (Optimising Use), Connecting Mobility and Automatisch Rijden (Automated Driving).
Chapter 3 describes a number of specific projects, activities and initiatives that characterise the situation in the Netherlands. These specific projects, activities and initiatives have been launched and partially implemented over the past few years, within the first five priority areas set out in the European ITS Action Plan and the ITS Directive:

1 Optimal use of road, traffic and travel data;
2 Continuity of traffic and freight management ITS services;
3 Road safety and safety of freight transport;
4 Integration of the vehicle into the transport infrastructure;
5 Data protection and liability.

Chapter 4 presents the results of the ITS activities and projects in the form of Key Performance Indicators (KPIs).
Chapter 5 contains a conclusion and closing remarks, as well as a number of requests that the Netherlands wishes to present to the European Commission.

Annex 1 contains a list of abbreviations.
Annex 2 contains a list of all ITS projects, activities and initiatives that have been launched.
Annex 3 contains an overview of international organisations related to ITS, C-ITS and Automated Driving.

1 Progress of ITS Actions in the Netherlands

This chapter describes the progress made in implementing the EU ITS actions in the Netherlands. Under the Directive 2010/40/EU of the European Commission five ITS actions have been defined to accelerate the deployment of innovative transport technologies across Europe. These actions are contributing to the compatibility, interoperability and continuity of ITS solutions across the EU and are also complementary to the Dutch ITS Strategy. The Netherlands started implementing these actions in mid-2013 and the progress made is reported below:

The five ITS priority actions are:

A MULTIMODAL TRAVEL INFORMATION SERVICES

A delegated act for ITS action has recently be adopted by the European Commission. Now this is in place, the Netherlands will be able to proceed with implementation. A national access point for data has already been set up and a number of service providers, including Google, are offering real-time multimodal travel information. Also information about tariffs can be added. Currently all nine Dutch Public Transport Operators exchange information via a static Dutch system. This information is integrated and translated by three integrators and then used by over 500 information providers (e.g. websites, apps and technology providers). The Netherlands has about 45,000 stops. All data about these stops are recorded in the National Database Stops (CHB). Each stop has a unique national stop number. In addition to general information, the file contains information such as name and coordinates and information about accessibility and facilities at the stop (shelter, trash, etc.). In the Netherlands attention is being paid to following European standards.

B REAL-TIME TRAFFIC INFORMATION SERVICES

The national legislation was published in mid-2017. An existing data warehouse NDW provides real-time traffic information for service providers. The access point creates a register for public/private metadata. The national access point will frequently review the quality with input of public and private parties. For the implementation of action B an overview has been produced of the data types (public/private) referred to under this action, with an indication of the extent to which these are available. A suitable (helpdesk) process that can be used to ask questions and make comments is in place for virtually all available data types. For the other available data types a web form, e-mail address and/or telephone number has been set up as a minimum. These helpdesks and web forms will be used to organise the required feedback loop. The regulations will apply at least to the main road network. Discussions will be held with the regions on the possible selection of additional priority zones. We also think about the possibility to organize meetings with private parties in order to improve the quality of the information chain.

C SAFETY RELATED TRAFFIC INFORMATION

After the legislation entered into force on 1 July 2015 a national ITS access point (NT-ITS) was set up, under the management of the National Traffic Data Warehouse (NDW). A register for public/private metadata has therefore been created for action C. Rijkswaterstaat has conducted a self-assessment as a data provider for Action C for the period June 2016 to May 2017.
Some results of this study are:
- Most of the time, an SRTI message has been sent within 15 minutes in more than 85% of the breakdown incident cases.
- For accidents, a SRTI message has been sent within 15 minutes in 89% of the studied cases.
- For road obstacles, 90% of the reported messages causing indeed unsafe traffic situations, because there is an object lying on the road.

In partnership with Germany and Austria, the Netherlands (NDW) developed a set of metadata that has since been incorporated into the European ITS Platform, EU-EIP, and is now being promoted, with support from the EC, for use within the national access points of all Member States. These metadata can also be used for other priority actions. A supervisory body has been designated.

The supervisory policy was published by the National Vehicle and Driving Licence Registration Authority (RDW) in the Government Gazette on 26 June 2015 and entered into force on 1 July 2015. The sanctions policy was published by the Ministry of Infrastructure and the Environment on 14 January 2016 and entered into force the next day. The regulations apply to the main road network. According to RDW, four parties (one public and three private) provide the metadata. Compared with other countries, there is less of a need for private parties to supply their metadata to the national access point, as these parties had already established good links with each other before 1 July 2015. Data contracts have already been concluded between them, for example.

D HARMONISED ECALL FACILITIES

The Ministry of Security and Justice is responsible for implementing the 112 facility, specifically the National Police. A provisional facility for receiving (pan-EU) eCalls is expected to be ready by 1 October 2017. In 2016 Rijkswaterstaat was asked to contribute to the development of eCall for trucks as an associate member. For further information please see: http://iheero.eu/.

With this project the emphasis is on actually implementing the eCall chain from the truck, up to and including the retrieval of information on the load. An incident for which the emergency services are required is passed on to the safety region's regional incident room. The provisional results were shared at a meeting held in July 2017. During the meeting, which was a contribution of Rijkswaterstaat to the European I-Heero project aimed at realizing eCall, several European organizations were present, such as CEN, IRU, UNECE, ERTICO. The participants were businesses and public authorities came from 18 European countries. The results of the meeting are incorporated into the reports of the CEN project group and in the i-Heero project. The UNECE will further work together to allow HGV eCall to fit into new ADR legislation. There is an existing link between 112 and VCNL (national Traffic Control Center), with HTML feed, which can be further automated and integrated in 2018, also in Safety Related Traffic Information feed to NDW.

E INFORMATION SERVICES FOR TRUCK PARKING

After the legislation entered into force on 1 July 2015 a national ITS access point (NT-ITS) was set up, under the management of the NDW. A database containing data on truck parks, including certain data on the available facilities, is therefore available for action E.
A supervisory body has been designated and the supervisory policy was published by the RDW in the Government Gazette on 26 June 2015 and entered into force on 1 July 2015. The sanctions policy was published by the Ministry of Infrastructure and the Environment on 14 January 2016 and entered into force the next day. Priority roads and zones have been selected to which the regulations apply. At present, the access point contains data on 339 truck parking spaces. Nine organisations (private and public) have offered their data to the national access point.

2.1 POLICY

Increasing pressure on accessibility, safety and quality of life in Europe's regions means that ITS solutions are gaining in importance. In the Netherlands too we are increasingly considering solutions that will keep our cities accessible without the need to create new infrastructure. Within this context we are benefiting from an existing basic ITS network. During the 1980s and 1990s the Netherlands took a first major step and equipped its main road network with traffic management systems. Today these systems remain highly intelligent and ensure traffic is distributed as efficiently as possible over the country's main roads.

At the same time, road users are receiving more and more support from innovative services offered by market parties. These developments are occurring at a rapid pace, but are not following a linear path. In December 2015 the Minister of Infrastructure and the Environment therefore reported as follows to the Dutch Parliament:

> *We find ourselves in a transitional phase in which prevailing technologies and modes of transport are being combined with innovations. Over the coming years we will therefore need to learn on an ongoing basis how to handle these developments in practice.*

In the Netherlands two major developments with an impact on the future of mobility have been outlined: smarter transport thanks to informatization and vehicle automation.

1 In the Netherlands information systems that allow road users to be continuously connected to their environment are experiencing rapid growth, e.g. navigation systems, route planners and supporting services for traffic on smartphones. The technical capabilities of (public) traffic management systems are expanding and supporting this development. Road users expect to receive increasing amounts of customised information. Since 2013 this transition to a personalised service has been facilitated by the Optimising Use and Connecting Mobility programmes.

2 The second visible development relates to the fact that vehicles are taking over more and more tasks from the driver. (Automotive) manufacturers are taking steps in this area so they can offer added value directly to their customers in the form of additional comfort, safety and functionality. Over the longer term these developments will create opportunities for road users to make better use of their journey time, as they will be able to devote the time they spend behind the wheel to other things. In 2016, during its EU Presidency, the Netherlands requested that attention be focused on this development. A first step was taken towards greater European harmonisation with the Declaration of Amsterdam (see page 12).

The informatization of the transport system and vehicle automation mean that infrastructure, road users and vehicles are becoming increasingly interconnected. This convergence of developments is creating opportunities for both the government and industry to offer road users even better mobility at a lower cost and using new earnings models.

Figure 1: shows the programmes mentioned and the policy lines in the area of ITS

ITS Plan The Netherlands
2013-2017 — 2017

Optimising Use Programme → Optimising Use Follow-up — 2018

'Better informed on the road' roadmap — 2023

EU Pres. → Declaration of Amsterdam — 2023
2016

2013

OPTIMISING USE PROGRAMME/FOLLOW-UP

Within the framework of the Optimising Use programme the Dutch Government, regions and industry are working together to improve accessibility by road, water and rail in the country's busiest regions. In 2014 the decision was taken to continue the programme until the end of 2017. The Ministry and regions are investing an additional sum of around 600 million euros with the aim of improving door-to-door journey times by 10% in these busiest regions during the rush hour. Of that investment arround 90 million euros is used for ITS in the Partnership Talking Traffic. To make this possible, approximately 400 projects are being implemented in total in the 12 regions concerned.

Over the coming years the emphasis will therefore be placed primarily on measures that enable travellers to reach their destination quickly and smartly. The approach will involve working on a number of key themes, including ITS. Within the ITS theme the Partnership Talking Traffic has been set up. The aim of this partnership between the Ministry of Infrastructure and the Environment, 12 regions and three business clusters is to work on a new chain of information services for the road user, e.g. traffic signals, events and logistical processes.

Within the Partnership Talking Traffic the parties are working, for example, on the development of a new generation of traffic lights known as intelligent traffic control systems (iVRIs). These not only transmit data to vehicles and cyclists, but also receive data from them and adjust traffic control accordingly. More on the Partnership Talking Traffic you can find in section 3.2.

THE ERA OF THE SELF-DRIVING CAR

Getting into a self-driving car - is this still a long way off? Not for Europe's Transport Ministers. On 14 April 2016 they put their faith in self-driving technology and took a trip along public roads in Amsterdam - a genuine first. During its EU Presidency the Netherlands requested that attention be paid to the emergence of the connected and automated car. With the Declaration of Amsterdam, Minister Melanie Schultz van Haegen from the Ministry of Infrastructure and the Environment underlined the importance of effective cooperation between government and industry, preparing Europe for a new era in transport and logistics.

Unless the EU Member States work together, there is a risk that too many different regulations could be developed and create an obstacle to the availability of the new technology. Agreements are also needed in relation to aspects such as liability, privacy, cybersecurity and the impact of self-driving cars on transport and the road network. 'A long term European collaboration between government and industry is a must. How annoying it would be if you had to reset your self-driving car every time you crossed a border', Minister Schultz-van Haegen explains.

THE ADVANTAGES OF SELF-DRIVING CARS

Vehicle technology is developing at an impressive pace. Cars and trucks are being equipped with an ever-growing number of automated functions, such as park assist, brake assist and traffic jam assist systems. The next generations of smart vehicles will relieve drivers of an increasing number of tasks. Vehicles will also increasingly be in contact with each other and the infrastructure thanks to the exchange of information.

These automated functions and connection to the environment will result in:
- increased safety;
- lower CO_2 emissions;
- improved traffic flows;
- more comfortable and restful transport for passengers;
- more efficient use of infrastructure and less traffic congestion;
- a greater choice of transport for target groups with mobility issues, e.g. the elderly and people with a physical impairment.

Further automation of vehicles and advances in information and communication technologies provide excellent opportunities to improve traffic flows and to make transport safer, cleaner and easier.

Figure 2: connected, cooperative and automated driving developments should come together to harvest societal benefits
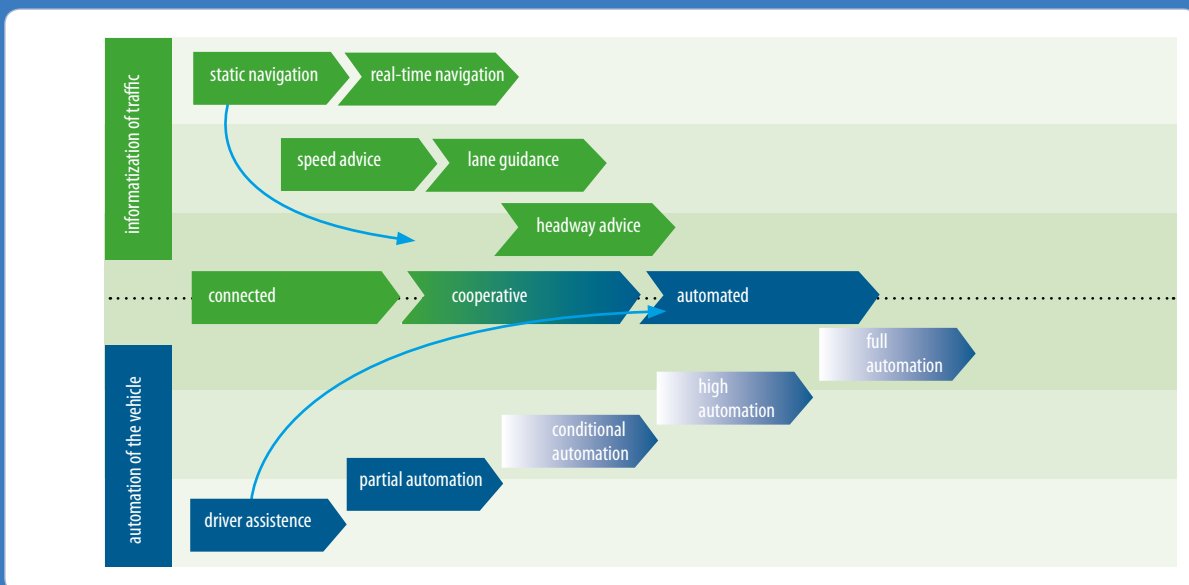
DECLARATION OF AMSTERDAM

The Declaration of Amsterdam contains agreements on the development of self-driving technology within the EU. It was signed by the Transport Ministers of the 28 EU Member States on 14 April 2016 during the informal Transport Council. The declaration will help the Member States, the European Commission and industry to draw up rules and regulations for self-driving vehicles on our roads. A first high-level meeting was held in February 2017 as a follow-up to the signing of the document on 14 April 2016. During this meeting the Transport Ministers made a number of initial agreements to implement the Declaration of Amsterdam.

SELF-DRIVING VEHICLES EXPERIMENTS ACT

Besides promoting international harmonisation, the Dutch Government is keen to facilitate experiments involving vehicles in which systems take over the task of driving from humans, either temporarily or entirely. These experiments will eventually result in permanent regulations governing self-driving vehicles. As self-driving vehicles are still being developed and we still do not know what they will look like in the future, they will be allowed onto public roads initially for the purpose of experiments. The aim is to create a system of discretionary permits that allow experiments to be carried out during which the driver monitors the vehicle directly from the outside, while a system determines the vehicle's behaviour. These experiments will allow automated functions to be tested in traffic without the need for a driver, as referred to in the legislation, to be inside the vehicle.

THE EXPERIENCE: MINISTERS STEP INSIDE

The Experience was a journey undertaken by Europe's Transport Ministers in a partially self-driving car. They were transported from Amsterdam's National Maritime Museum to the Eye film institute. Minister Schultz used The Experience to underline the Netherlands' position as a testing hub for self-driving vehicles. The automotive manufacturers who took part in this initiative were Volvo, Daimler, BMW, Renault, PSA, JLR, Vedecom, TNO, Tesla and Audi. TomTom, the Municipality of Amsterdam, (the National Vehicle Authority) RDW, Rijkswaterstaat and the Ministry of Infrastructure and the Environment were also involved. Through The Experience they wanted to show what is already possible from a technical perspective and thus pave the way for the further development of self-driving technology.

EUROPEAN TRUCK PLATOONING CHALLENGE 2016

During its Presidency of the European Union in 2016, the Netherlands initiated a European Truck Platooning Challenge. This involved various makes of partly automated trucks driving in convoys (platooning) on public roads from several European cities to the Netherlands. Major European ITS corridors such as the Nordic Way and Rotterdam-Frankfurt-Vienna were used. The aim of the Challenge was to bring platooning one step closer to implementation, in the belief that truck platooning can become a reality in Europe in the near future. For more information on the European Truck Platooning Challenge 2016, please visit the official website www.eutruckplatooning.com. Nice to know: Truckplatooning continues in the logistics sector. During the experiments flowers, food and bulk goods are transported.

WEPODS

They have no steering wheel, no brake and accelerator pedals and 'answer' to the names WURby and WElly. These vehicles, known as WEpods, underwent intensive testing up to the summer of 2016. The tests focused not only on technical aspects, but on social aspects too. The main objective of this pilot was to develop knowledge. It did not result in a road-ready system, but created a partnership between the private sector, public sector and knowledge institutions, who are working together to bring automated driving one step closer.

In addition to developments in the technology in and around the vehicle, during the test phase attention was also paid to certification, insurance, liability, human behaviour, road management and legislation. Educational institutions such as Delft University of Technology and Wageningen University, businesses and public authorities shared their knowledge. Students worked on aspects including a test programme, a reservation system, training and security.

2.2 EXPENDITURE

In the document 'ITS-Plan the Netherlands 2013-2017' expenditure on ITS (roads) was estimated to be in the region of 200 million euros a year. In 2015 Rijkswaterstaat spent an estimated 145 million euros on dynamic traffic management (DTM) and ITS. This related to the performance of trials and tests, the management and maintenance of systems and applications, and the collection, management and distribution of data. Roughly half of this expenditure can be attributed to the management and maintenance of DTM systems (74 million euros). This can be traced back and allocated to the following network services, which are provided via Dynamic Traffic Management (see box).

Traffic direction and guidance	45%
Assistence with incidents	21%
Support with roadworks	3%
Operation/monitoring of tunnels and rush-hour lanes	21%
Provision of travel and route information	10%
TOTAL	**100%**

In addition, for the period 2014-2020 the government is being investing a total of 90 million euros within the framework of the Optimising Use ITS programme. For 2015 the investment is around 15 million euros and liquid funds are made available for the other two policy lines, as described in section 2.1.

A budget of around 4 million euros was made available for implementation of the Connecting Mobility action programme. In 2015 roughly 350,000 euros were spent on the additional actions referred to in the 'ITS-Plan the Netherlands 2013-2017'.

The total expenditure of the Dutch Government/Ministry of Infrastructure and the Environment on ITS and DTM in 2015 therefore came to 164 million euros. By way of comparison, in 2015 the Dutch Government spent around 650 million euros in total on management and maintenance and around 723 million euros on the construction of new infrastructure (roads).

PROVINCIAL AND MUNICIPAL EXPENDITURE ON TRAFFIC AND TRANSPORT

Provincial and municipal budgets and expenditure do not contain a separate 'smart mobility' item. This spending forms part of various other elements, namely roads, traffic and parking. Therefore it's hard to estimate expenditure. One of the most active Dutch regions in the field of ITS is the province of North Brabant. For the coming years this province has made a budget of 100 million euros available for new mobility solutions. In the province of North Holland an additional budget of 11 million euros has been proposed for 2018 and 2019, alongside the budgets for traffic management and management and maintenance. The above examples provide an insight into the size of the budgets that are also being made available at regional level to launch trials and pilots.

COMPETITIVE POSITION OF THE DUTCH ITS SECTOR

Within the framework of the 'Better informed on the road' roadmap, Connecting Mobility and Connekt have conducted a study[1] into the competitive position of the Dutch ITS sector. An initial baseline measurement for this monitor was performed in 2016. A survey has been drawn up and distributed amongst market parties and knowledge institutions active within the field of ITS in the Netherlands to gain an insight into investments, turnover and activities within the sector. This figure presents the key results obtained from the baseline measurement. A follow-up measurement was started in 2017.

DASHBOARD SURVEY RESPONDENTS

Developments and status quo
ITS organisations in the Netherlands
(2014-2015)

JOBS

88%

of ITS employees in NL
work for a Dutch company

EXPORT

68%

of companies export

COMPETITIVE POSITION

85%

of companies experiencing positive
development in competitive position

TURNOVER

€ 54%

of companies posting
increase in turnover

66%

of companies increasing exports

R&D

51%

of companies have increased
R&D efforts

KNOWLEDGE POSITION

4%

of employees at knowledge institutions
are active in field of ITS (NL)

82%

of knowledge institutions are positive
about relative development of knowledge

Figure 3: dashboard of quantitative results for companies active in the field of ITS in the Netherlands

2.3 INTERNATIONAL POSITIONING

There is no doubt that the field of ITS is taking on a more international dimension over time (for the Netherlands) this mainly means a more European dimension). Real progress can be made if we work together on an international level, starting in Europe. After all, vehicles and services are being developed for a larger, European market and systems need to be independent of national borders. There is only one possible solution: A long-term collaboration between government and industry (in Europe) is a must.

It is important for the Netherlands to play a leading role in the cooperation within Europe, as this will help us achieve our national objectives more quickly. Furthermore, being at the forefront of these developments will also create economic opportunities. Dutch stakeholders in the area of ITS, both public and private, are therefore actively involved in various European projects and programmes.

Although, at present, developments linked to connected and cooperative systems and self-driving vehicles are taking place in parallel, these development paths are expected to converge in the form of hybrid systems that work together seamlessly behind the scenes and the Netherlands promotes this. However, there is still a great deal of development and testing work to be done before we reach this stage.

As we are talking about highly complex and wide-ranging issues, one party will not be able to drive these developments forward on its own. Cooperation between parties from the private and public sectors will be needed in areas including testing and evaluation.

The Netherlands is a testing hub. Cooperation, particularly in the area of testing, is not only of interest to the Netherlands itself. Testing facilities in the Netherlands are already open to parties from other countries. To promote these, Dutch parties have taken the initiative of setting up the Smart Mobility Embassy[2]. Dutch testing facilities are being offered to foreign parties through this Embassy and national and local authorities, knowledge institutions and businesses are making their knowledge, experience and testing capabilities available within the network. An example of such a testing facility is De Innovatiecentrale (The Innovation Centre). This is an experimentation and development space within the South Netherlands traffic control centre. De Innovatiecentrale comprises innovation desks (De Innovatiedesks) and an innovation lab (Het Innovatielab). The figure gives an overview of the testfacilities in the Netherlands.

ORGANISATION	TESTFACILITY	TYPE TESTFACILITY
Rijkswaterstaat	Amsterdam Practical Trial	Open - real life
De Innovatiecentrale	Traffic Innovation Centre	Open - real life
Provincie Noord-Holland	Maas and More	Open - real life
Provincie Noord-Brabant/ITS Bureau	MobilitymoveZ.NL	Open - real life
Provincie Noord-Holland	Smart Mobility Schiphol	Open - real life
TASS International	A270 Testbed and PreScan Virtual Testing	Controlled
		Simulation
		Open - real life
RDW	RDW Testcentre	Closed track
		Controlled
		Simulation
		Other
Connecting Mobility	SimSmartMobility	Simulation
CGI The Netherlands	DiTTLAB	Simulation
		Open - real life

[2] www.smartmobilityembassy.nl

PLATFORMS

Numerous platforms are active as part of the cooperation at European level. The Netherlands has drawn up an inventory of these platforms and subdivided them by theme (connected, cooperative and automated), but also level (operational, tactical and strategic). An overview of all these platforms can be found in the annex.

Dutch parties endeavour to make an active contribution within the key platforms. For example, the Netherlands has contributed to the further development and maintenance of DATEX II, the language -independent data exchange standard that allows traffic information to be exchanged on a Europe-wide basis. The Netherlands has chaired the DATEX II strategy group since 2013 and has also participated in the projects carried out on the basis of the CEF ITS calls for 2014, 2015 and 2016. It has taken part in the horizontal projects EIP and EIP+ and is currently involved in the EU-EIP.

In addition, the Netherlands is a partner in the ITS Deployment Corridor projects Ursa Major and Arc Atlantique, in which parts are being taken from national programmes to create harmonised services. The primary objective as regards implementation is to continue the partnership with fellow road managers across Europe at an operational and tactical level and to develop joint regulations for the purposes of harmonisation. The Netherlands is also actively involved in European platforms such as the EU C-ITS Deployment Platform, C-Roads, GEAR2030, the Oettinger Round Table and ERTICO. With the successful launch of the Traffic Management 2.0 platform and SOCRATES a start has also been made on the path towards continued European cooperation with a view to further integrating traffic management and traffic information. For an overview of international organisations see Annex 3.

3 Projects, activities and initiatives

3.1 INTRODUCTION

This chapter presents a selection of prominent projects, activities and initiatives in the field of ITS that have been launched or completed in the Netherlands since 2014. In recent years it has become clear that it is not only central government that is active in the area of ITS, but that many regional and local authorities are also incorporating ITS into their plans as a potential solution.

They are playing an active part in national programmes or taking the initiative themselves by encouraging ITS developments. Private parties are also working intensively on the development of ITS in the Netherlands, either independently or in partnership with parties from the public sector. Based on the evaluation of several projects in the Netherlands, it becomes clear that there is a wide range in the involved regions and also user groups, ranging from less than 500 to over more than 50.000 users. Furthermore, public authorities and private parties are investing in the management/maintenance of existing traffic management systems and are working to optimise them on an ongoing basis.

For each priority area outlined in the ITS Action Plan 2013-2017 the developments that can currently be observed are described. This is done using examples of projects, activities and initiatives that are under way and have been partially completed. The examples given in this chapter are considered to have been the most influential in recent years in terms of developments at national and international level. Only projects and activities that have a physical presence or have been implemented, whose budget has been spent and whose effects have been reported on are included. In addition to these projects, Annex 2 presents a table containing a complete overview of all the projects started or completed over the 2014-2017 period. The example projects are described in more detail in the following sections.

Section 3.7 also sheds light in particular on a number of new national developments that are of interest from the European perspective and characterise ITS in the Netherlands. These projects are currently scheduled for implementation in the near future.

The priority areas covered in this chapter are:

1 Optimal use of road, traffic and travel data;
2 Continuity of traffic and freight management ITS services;
3 Road safety and safety of freight transport;
4 Integration of the vehicle into the transport infrastructure;
5 Data protection and liability.

3.2 PRIORITY AREA 1: OPTIMAL USE OF ROAD, TRAFFIC AND TRAVEL DATA

For a number of years now we have been able to observe a general trend towards the collection and provision of traffic data. This has been initiated by both public authorities and market parties. Public authorities are creating a framework by making data available and accessible, in line with the EU's open data policy and ITS Directive. Market parties then make use of these data. This is implementing one of the six transition paths presented in the 'Better informed on the road' roadmap.

Cooperation between public authorities and market parties ensures that data flows are optimised. These parties have been brought together within neutral platforms such as Geodata for Roadtransport (MOGIN), Public Transport data (BISON), and Dynamic Traffic Management data (DVM-Exchange). These platforms, which are open to all parties concerned, deal with questions of functionality and the technical translation of data flows into standards. The national platforms also work together to prepare for relevant decisions within European standardisation bodies, ensuring that Dutch interests are presented consistently and cohesively in Europe.

In the Netherlands the data collected are entered into a national database. Road traffic data flow into the National Traffic Data Warehouse (NDW). These data are combined, stored and subsequently distributed to users. Road managers themselves use the data to control traffic from their traffic control centre using ramp metering, route information panels and other traffic management tools. Service providers inform and advise travellers before and during their journeys via radio, TV, websites, apps and navigation systems. Current traffic data are used to build up a historical record, on the basis of which traffic analyses are performed.

The source data for public transport travel information is received by the organisation CROW-NDOV. Source data from the transport companies is made available to the market via data platforms. The quantity, continuity and quality of the source data are measured by the implementing organisation. The Netherlands is the first country to make all of its real-time public transport travel information available, enabling private parties to provide travellers with personal travel information.

FLOATING CAR DATA

In recent years both public and private parties have noted that a limit has been reached in terms of the data that can be obtained from road managers. These data flows are being optimised, including by means of standardisation, but new techniques are needed if the growing need for data is to be met. Public authorities and market parties are now conducting trials that involve obtaining data via in-car systems, so-called Floating Car Data (FCD).

The Netherlands expects this alternative data source to make current collection systems redundant in the future. Over the coming years, however, the strategy will be to maintain both collection methods, although investments will be focused on FCD developments.

PARTNERSHIP TALKING TRAFFIC

Stakeholders   Ministry of Infrastructure and the Environment, all regional authorities within Optimising Use, Vialis, Dynniq, Swarco, Ericsson, Simacan, Siemens, Sweco, KoHartog Verkeerstechniek, Royal HaskoningDHV, Ziut, Be-Mobile, KPN, Flitsmeister, MTVNL and Locatienet

Status   In progress

Area of realisation   National and international

Expenses   The Ministry of Infrastructure and the Environment, regional and local authorities and industry are jointly investing 90 million euros up to the end of 2020

DESCRIPTION

The Ministry of Infrastructure and the Environment and regional and local authorities within Optimising Use are working together with private parties as equal partners in an Innovation Partnership, with a view to developing and rolling out innovative traffic applications.

They are cooperating closely within three clusters by delivering low latency (milliseconds) C-ITS messages and services. The effective (ongoing) development of these clusters, and in particular chain cooperation between the clusters, will ensure that road users are always informed and supported with up-to-date, personal (customised) information during their journey. This might include information on traffic signals, speed limits, lane closures, events, incidents and parking information. Constant connectivity and the rapid transfer of data (from all parties to all parties, road users helping other road users) will make a real difference for road users, road managers and other stakeholders.

Cluster 1: availability of data, including that from light installation systems: in this cluster a new traffic control system architecture is being developed further, tested and commercially available end of 2017.
Cluster 2: from data to enrichment, check and aggregation. This cluster is dealing with the rapid transmission, processing and enrichment of data.
Cluster 3: new information services: a cluster focusing on the provision and use of in-car information services for road users.

The partnership with the transport industry, telecom and internet companies, and automotive firms has been established with the aim of developing and supplying innovative traffic applications over the next five years.

TARGETS

The innovative applications will allow road users, and in the near future self-driving vehicles too, to benefit from ongoing guidance and support while en route. This will enable them to better anticipate traffic situations, which will promote the flow of traffic and road safety. By the end of 2017 the companies will be making new technologies

available to road users that support them with driving and travel advice, and the new applications will be visible in practice, both on the street and inside vehicles. Within the Partnership Talking Traffic parties from the public and private sectors are working as equal partners. Together they will be able to create intelligent traffic systems in and around cities on a commercially viable scale and because of their scale these will have a visible impact. A key aspect of the partnership is the cellular LTE based low latency transfer of data, also in the development of a new generation of traffic signals that are able to communicate constantly with approaching vehicles and cyclists. These signals will optimise the flow of traffic at intersections and across the entire urban network, while giving priority to certain flows, e.g. heavy goods vehicles, the emergency services and cyclists.

RESULTS

By the end of 2017 around 1,250 traffic control systems (a quarter of the total number in the Netherlands) are expected to have been replaced with the intelligent traffic control system.
Other results to follow, work in progress.

NDW FLOATING CAR DATA

Stakeholders	NDW and Be-Mobile
Status	In progress
Area of realisation	Province of South Holland, scaled up to national level from 1 March 2016
Expenses	The contract has been concluded for at least one year, with the option of three annual extensions.

DESCRIPTION

Over the past two years NDW has been focusing on a different way of collecting journey times for traffic management purposes. This is because more and more of NDW's partners want to reduce the amount of equipment at the roadside, while receiving information on a greater number of roads. Floating Car Data (FCD) is a potential solution and NDW therefore looked into the possibilities and quality offered by this technology. The results were so positive that tenders were invited to provide FCD services across the whole of the Netherlands. The contract was awarded to Be-Mobile.

TARGETS

Journey times calculated on the basis of Floating Car Data (FCD) have been accessible since 1 March 2017. These data are being made available to NDW's partners and users, as well as in the form of open data. The underlying 'raw' FCD are not released and are only available within the digital partner environment. NDW has opted for open data, as all its partners and users believe it is important to make traffic data available.

Releasing the journey times calculated on the basis of FCD ensures greater national coverage, allowing service providers to continue to pass on journey time information and further optimise their service. In addition, public authorities can continue to comply with their open data obligation.

RESULTS

At present the journey times calculated from FCD are available for part of the Netherlands only. Over the course of this year FCD will gradually replace the current method of collecting journey time information and the data for the rest of the country will be released.

Innovating with Floating Car Data
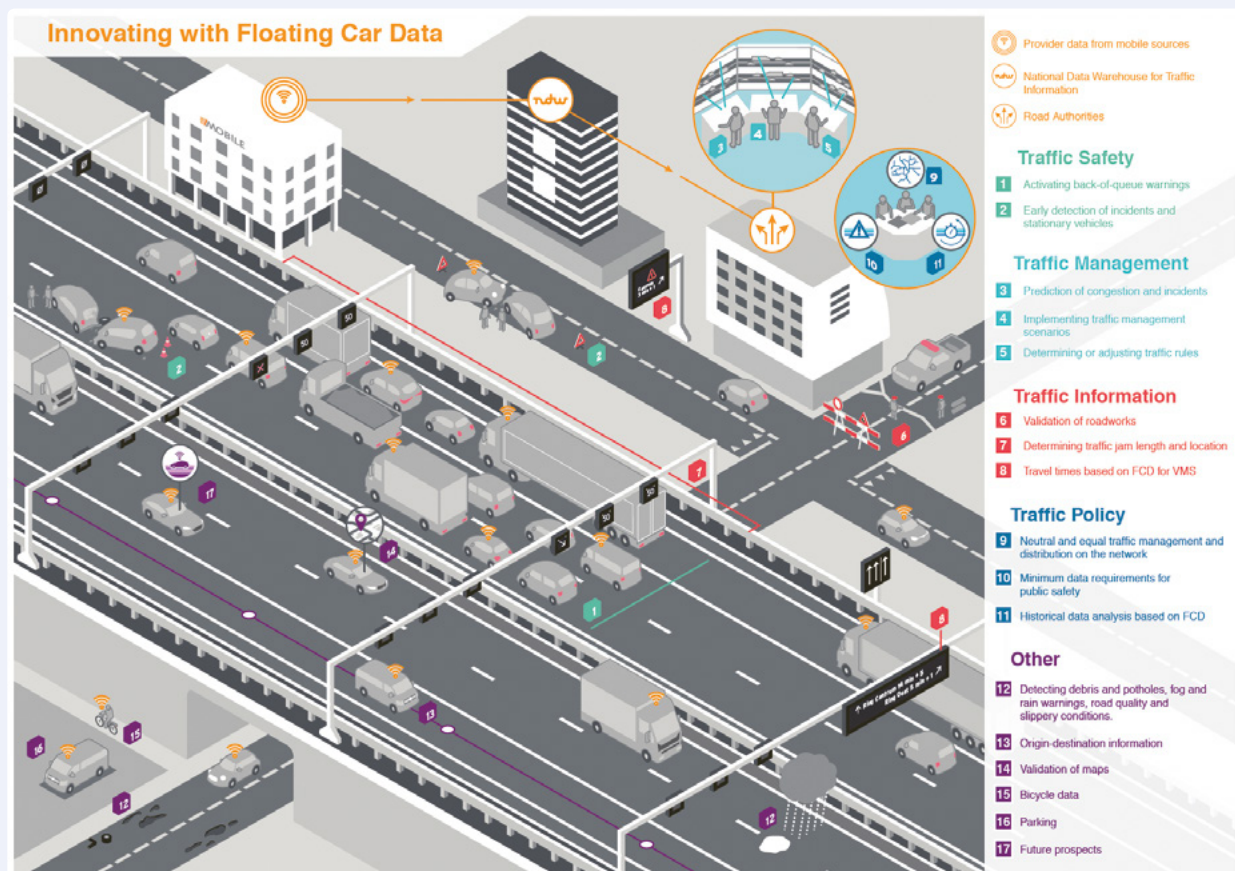
DATA TOP 8

Stakeholders	Ministry of Infrastructure and the Environment, 11 Optimising Use regions
Status	In progress
Area of realisation	National
Expenses	4.38 million euros/1 year/public

DESCRIPTION

For the public data items in the Data Top 8 a quantitative insight has been provided into the current level of quality. The quality improvements that can be expected by the end of 2016 and the end of 2017 have also been indicated. This insight and these expectations have been carefully formulated by the Optimising Use regions within the Data Group. The quality of the public data supplied differs from one region to another and also from one road manager to another within a region. All the municipalities within a region also need to work together to organise and safeguard the supply of data internally and at national level. The above insight and assessment cannot be regarded as firm guarantees. As the data items in question fall under the open data policy, there is no or only a limited guarantee with regard to their quality and availability.

TARGETS

The aim is to supply qualitative data for the top 8 categories with the highest possible intensity/coverage, combined with a high level of data reliability.

RESULTS COMPARED WITH 2014

Up to 2014 there were five top data themes: roadworks; location reference; speed limits; indication of remaining time needed to deal with incidents; traffic measures in traffic control scenarios. This list has been expanded and refined through the addition of the following themes: rapid communication of intensities, speeds and matrix board display statuses on motorways; bridge opening data; parking data; event data and traffic control system data. Since 2016 the data available have had the highest possible intensity/coverage, combined with a high level of reliability.

CHARM

Stakeholders	Rijkswaterstaat and Highways England
Status	In progress
Area of realisation	International
Expenses	62 million euros/one-off/public

DESCRIPTION

The CHARM programme involves the purchase and roll-out of a new generation of traffic management systems (ATMS: Advanced Traffic Management System) for road traffic control centres. Through this programme RWS and Highways England are ensuring that the systems they implement are future-proof. Innovative traffic management modules are also being developed via a Pre-Commercial Procurement (PCP) procedure. These modules have to fit in with the ATMS architecture. The CHARM programme is being implemented in the form of a number of different projects: ATMS System Provider, Pre-Commercial Procurement, Operational Service Manager, Prerequisite Projects and Implementation of Work Processes and Management Chains.

TARGETS

The DYNAC traffic management software can be expanded with innovative modules. These are currently being developed by the market within CHARM, as part of a Pre-Commercial Procurement (PCP) structure. At present eight companies are working on a prototype of their proposal for an innovative module for: advanced network management, faster incident detection and prediction, and in-car systems. These prototypes will be ready by mid-February 2016 and, following selection, will be tested on DYNAC.

RESULTS

Efficiency at the traffic control centre: fewer actions, shorter training times. Improved architecture creates more opportunities for innovation and results in simpler implementation of new systems. Construction projects can be implemented more quickly and more cheaply due to a reduction in/easier configuration management. Fewer lost vehicle hours (up to 5%) due to traffic measures being implemented/removed more quickly, smarter control and more effective traffic management.

USE OF INFORMATION SERVICES DURING ROADWORKS

Stakeholders	Rijkswaterstaat and service providers
Status	In progress
Area of realisation	Schiphol-Amsterdam-Almere
Expenses	250.000 - 300.000 euros
	Note: completely dependent on the region and the problem to be solved

DESCRIPTION

Within the Schiphol-Amsterdam-Almere (SAA) programme the service providers Innovactory and Be-Mobile are identifying the locations of road users in the vicinity of (upcoming) roadworks that involve major disruption to traffic. Based on their location, a notification announcing the works is sent to the mobile phones of these road users in the run-up to and during the disruption. Road users receive these notifications via the TimesUpp (Innovactory) or Flitsmeister (Be-Mobile) app. The content of the notification depends on the location and the works in question. A link in the push notification gives recipients the option of navigating to the online SAA visitor centre, where they will find background information on the works and alternative routes.

TARGETS

The road network between Schiphol, Amsterdam and Almere is being widened. To limit the disruption as much as possible during these roadworks, SAA has also been using push notifications since 2014. The project team's approach is based on the principle of 'location-based warnings'. This initiative is an interesting collaboration between public authorities and market parties. With the service SAA aims to provide targeted information about the roadworks to as many road users as possible before they depart. This will ensure they are prepared as they take to the road and can make smart choices.

RESULTS

The measurable reach varies, but when the system is used on a busy SAA corridor such as the A9 or A1 could easily exceed 50,000 unique users. Around 10% of users also click on the link to the background information. SAA has conducted a number of pilots to determine the effect of the push notifications on traffic density (the extent to which drivers follow the advice). This effect is difficult to measure. However, the same applies to the effect of a more traditional newspaper advertisement providing details of upcoming roadworks. The number of people who follow the advice is also not known in this case.

SOCIAL MEDIA AS A DATASOURCE

Stakeholders   De Innovatiecentrale, Public Sonar
Status   Completed
Area of realisation South Netherlands
Expenses   Around 40.000 euros

DESCRIPTION

In the second half of 2015 the idea emerged of investigating whether open social media could be used as an information source to support operational traffic management. The following assumptions were made:

- Sufficient reports are available on open social media concerning traffic situations on the main or underlying road network.
- If the right technology is used, it will be possible to analyse this volume of reports in real time and reduce the volume to a manageable level for the road traffic controller.
- The reports could support the process of identifying undesirable situations and/or provide an enhanced insight into what is happening.

Based on the above a pilot has been launched with the aim of answering the following questions:

- Do the open sources contain information that is of value for RWS's road traffic controllers and in what situations will it prove valuable?
- Can relevant reports be filtered automatically and how can they be easily presented?
- What are the prerequisites for successful implementation within the operational process?

Once preparatory steps had been taken, the pilot was launched in April 2016 and implemented within the operational process of the South Netherlands Traffic Control Centre (VCZN).

TARGETS

Relevant reports concerning the area covered by the VCZN were collected and analysed over a number of weeks. During this 'preliminary research' it was confirmed, amongst other things, that the open sources contain information of value for RWS's road traffic controllers. It was also determined how the area covered by the VCZN could be delimited and an initial division into relevant themes was worked out.
Based on the input from the case study, the initial version of the monitor was delivered so that it could be put to use. The aim was to allow users to ascertain in which situations and under which conditions real-time reporting from open sources offers value. The results were discussed during various workshops and the content of the monitor was adapted where necessary.

'On-site support' was also provided on a regular basis. Based on the insights gained from the first phase, a number of measures were taken. Cases were refined and the percentage of relevant reports was increased. Eleven extra accounts were also created. During this phase the prerequisites for successful implementation were investigated further.

RESULTS

It was established that reports on open social media contain information that is of value for RWS in general and for traffic control centres in particular. This information can help road traffic controllers to make quicker and/or better decisions. Most of the informative value was identified in relation to the use cases:

- Detecting 'hazardous situations', 'debris on the road' and 'problems with street furniture'. Here detection refers to making situations visible that are not yet known within the centre.
- Gaining an insight into incidents and crises. The pilot demonstrated that support is valuable in the event of major incidents and crisis situations. During the crisis affecting the Merwede Bridge the value of the information available on open sources was high.

The following figures underline the value of the information:

- Every month around 10,000 reports concerning the area covered by the centre are collected and automatically analysed. 97% of these originate from Twitter and 3% from Instagram. No relevant Facebook pages were found.
- Of all the reports collected 10% are 'potentially relevant' for road traffic controllers. This represents an average of around 15 reports per shift. Night shifts were disregarded. It was also noted that the volume of report traffic is lower at weekends than during the week. Of the reports collected 15% contain image material.
- Of the 1,000 'potentially relevant' reports 50% relate to congestion, roadworks, etc. During the pilot these were considered less relevant, as the road traffic controller was already aware of the situation. 35% of the reports support the process of detecting the situations outlined above and 15% support the process of (detecting and) gaining an insight into incidents and crises.

3.3 PRIORITY AREA 2: CONTINUITY OF TRAFFIC AND FREIGHT MANAGEMENT ITS SERVICES

Relative to the previous Progress Report there has been increasing attention to this priority area 2. In priority area 2 the Netherlands is focusing in particular on logistics, as logistics has been designated as one of the top sectors of the Dutch economy. With regard to traffic management the Netherlands has already taken significant steps and has identified cooperative systems (priority area 4) as the area where the greatest improvements can be made.
Priority area 2 is mainly characterised by the large-scale public-private partnerships within the logistics chain. The exchange of information is the most important enabler here. One interesting development is the national public-private partnership within the Neutral Logistic Information Platform (an open ICT platform for the exchange of logistics data). This has resulted in the I-share project, within which parties are making agreements on the identification, authentication and authorisation of logistics data.
The Netherlands is focusing attention specifically on the optimisation of cross-border traffic (customs clearance, etc.). Projects depend to a large extent on international developments, such as truck platooning and the electronic consignment note. These will only work if a number of countries are participating.

NEUTRAL LOGISTIC INFORMATION PLATFORM (NLIP)

Stakeholders	Logistics Top Team, Connekt, EVO, Schiphol Group, Rotterdam Port Authority, TLN, Fenex, VRC, ECT, KLM, Ministry of Finance (Customs), Directorate-General for Public Works and Water Management (RWS), Ministry of Economic Affairs, Cargonaut, Portbase, Amsterdam Port Authority, LINC, ACN, APMT, Frugiventa, Flora Holland, Logius, Delft University of Technology
Status	In progress
Area of realisation	National
Expenses	6 million euros/annual/public/private

DESCRIPTION

The NLIP is a state-of-the-art information channel. Using the NLIP ensures that parties only have to pass on information once. This is then shared with all the data platforms required as part of the logistics flow. The owner of the information decides with whom information is shared and under what conditions and therefore always retains control. The ambition is to maximise the availability of data for relevant parties.
The NLIP draws on the knowledge and experience acquired from working with the existing, successful information platforms of Schiphol (Cargonaut), the Amsterdam and Rotterdam Port Authorities (Portbase) and the government (Digipoort), and new platforms will be added to it. All these platforms 'talk to each other' and this should eventually result in an integrated platform.

TARGETS

The aim is for 90% of the Dutch supply chain to be connected to the NLIP and for all businesses and public authorities to communicate with each other in a tandardised way via this platform by 2020.

RESULTS

Thanks to this platform, logistics companies can supply information once and this is then available to all relevant parties. Better information makes chains more manageable, reliable, flexible, cost-effective and transparent. Means of transport and infrastructures are also used more efficiently. This helps to improve predictability and reduce the regulatory burden, as well as cutting administrative and compliance costs. Optimising the chain in this way creates a competitive advantage.

RESULTS COMPARED WITH 2014

In cooperation with market parties, an efficient, smart and robust access system is being developed for trucks at terminals and business premises. A pilot focusing on uniform registration procedures is being conducted and, if successful, can be rolled out nationally.

iSHARE

Stakeholders	All partners to the agreement, leading logistics players, Innopay
Status	In progress
Area of realisation	National
Expenses	650,000 euros/in 2016/public/private

DESCRIPTION

Since June 2016 public and private parties from the Transport & Logistics sector have been jointly developing uniform agreements on identification, authentication and authorisation as part of the iSHARE project. This set of agreements means that it will soon be possible for everyone in the logistics sector to share data with everyone else in a simple and controlled way - including previously unknown parties.

TARGETS

Through the iSHARE project NLIP aims to remove obstacles to data sharing, promote cooperation within the chain and scale up, accelerate and effectively link together existing initiatives focusing on the exchange of digital data.

RESULTS

Not yet realised

BLUE WAVE FOR WATERWAYS

Stakeholders	Ministry of Infrastructure and the Environment and four regional parties
Status	In progress
Area of realisation	National
Expenses	300,000 euros from the Dutch Government + contribution from regional parties

DESCRIPTION

The Blauwe Golf Verbindend project focuses on facilitating the supply of information between waterway managers, shipping traffic and road traffic on real-time opening times of bridges and locks and the availability of moorings.

TARGETS

Blauwe Golf Verbindend aims to improve the exchange of information between waterway managers and users and road traffic in relation to real-time opening times of bridges and locks and the availability of moorings.

RESULTS

The creation of an overarching Blauwe Golf Verbindend online portal that provides reliable, up-to-date information on bridge and lock opening times and on the availability of moorings, and passes these data on to existing traffic data flows and data distribution platforms (NDW, FIS).

BGV became operational in May 2014. A stable data platform has therefore been implemented that provides prompt, up-to-date information on bridge openings and the occupation of moorings.

This relates to the following (status) information:
- Bridge status (open/closed);
- Planned bridge opening times;
- Availability of moorings;
- Obstructions on waterways resulting from:
- Planned restrictions (including work on the waterway);
- Unplanned restrictions (including accidents and extreme weather);
- Clearance height of objects;
- Text on dynamic route information panels (DRIPs).

A viewer is available at www.blauwegolfverbindend.nl that represents (a portion of) the data collected in graphical form. In addition, the ENCs (Electronic Navigational Charts) can be downloaded from www.blauwegolfverbindend.nl

iCENTRALE

Stakeholders   Ministry of Infrastructure and the Environment and four regional parties
Status   In progress
Area of realisation National
Expenses   Each of the parties has financed its own investment

DESCRIPTION

Within the iCentrale programme businesses, provinces and municipalities are working together to allow the centralised operation of tunnels, bridges and locks to be organised in a different - and above all smarter - way. They are also aiming to restructure the use of traffic measures and city surveillance and management. To date regional and local authorities have been working with their own (control) centres, their own technical systems and their own personnel, who also differ from one area to another (tunnels, roads, waterways and urban access). On the one hand, these centres are the beating heart of the organisation responsible for managing traffic, transport, surveillance and safety. On the other, they cost these authorities large sums of money every year due to the necessary investments, management and maintenance and high structural operating costs.

TARGETS

For public authorities the programme will bring about a structural reduction in (operating and replacement) costs. In addition, there will be an improvement in accessibility, quality of life, safety and surveillance in the (urban) environment. Road users, residents and businesses will notice this in the form of short, reliable journey times, a reduction in unnecessary waiting times, an improved living environment and a more positive climate for business establishment. Experts estimate that this will deliver efficiency gains of around 10% to 20%. There is also potential to make savings in the region of 20-25 million euros a year, compared with the current situation in which regional and local authorities manage and staff centres themselves. This new approach is already more common in other countries than it is in the Netherlands. Network performance in busy urban areas could improve by around 5% to 15%.

RESULTS

The iCentrale project is expected to be ready to roll out in 2018.

ELECTRONIC CONSIGNMENT NOTE

Stakeholders	EVOfenedex, TLN, Transfollow
Status	In progress
Area of realisation	National/international
Expenses	Approximately 5 million euros

DESCRIPTION

The CMR consignment note is an official document that is mandatory when goods are transported internationally. By signing the document, the shipper and carrier make agreements on the consignment, the insurance of the goods and liability in the event of damage. The digitisation of this 80-year-old document is making many of the administrative tasks previously required to send, enrich and archive the document redundant. Supply chain partners also have a direct insight into the progress and status of the shipment. One major benefit is the fact that the carrier can send the invoice as soon as the goods have been delivered.

TARGETS

Using a digital rather than a paper CMR consignment note can generate significant cost savings. After all, only one document now needs to be created. This can then be transmitted digitally to the driver and the ultimate recipient of the goods. Use of the digital consignment note eliminates many tasks from the overall logistics chain. Furthermore, the risk of the document containing incorrect information and of damage, loss or fraud is considerably smaller compared with a paper version. The efficiency gains within the administrative process amount to around 4.5 euros per consignment note. Approximately 40 million CMR consignment notes are used every year within the sector. In the Netherlands alone use of the e-CMR could save as much as 180 million euros a year in administrative costs.

The benefits of the e-CMR:
- A digitised transport chain requires less paper, so it is better for the environment
- e-CMR saves on printing costs
- The electronic application is multilingual, facilitating international transport and controls by national authorities
- Electronic documents are cheaper to process, with no costs incurred for archiving
- Currently, paperwork gets processed only when drivers return to the office, whereas electronic documents can be handled in real-time
- Improved supply chain visibility with electronic consignment notes could help enforce European laws, such as those on cabotage

RESULTS

Results will be achieved once use of the e-CMR has been accepted by all EU Member States.
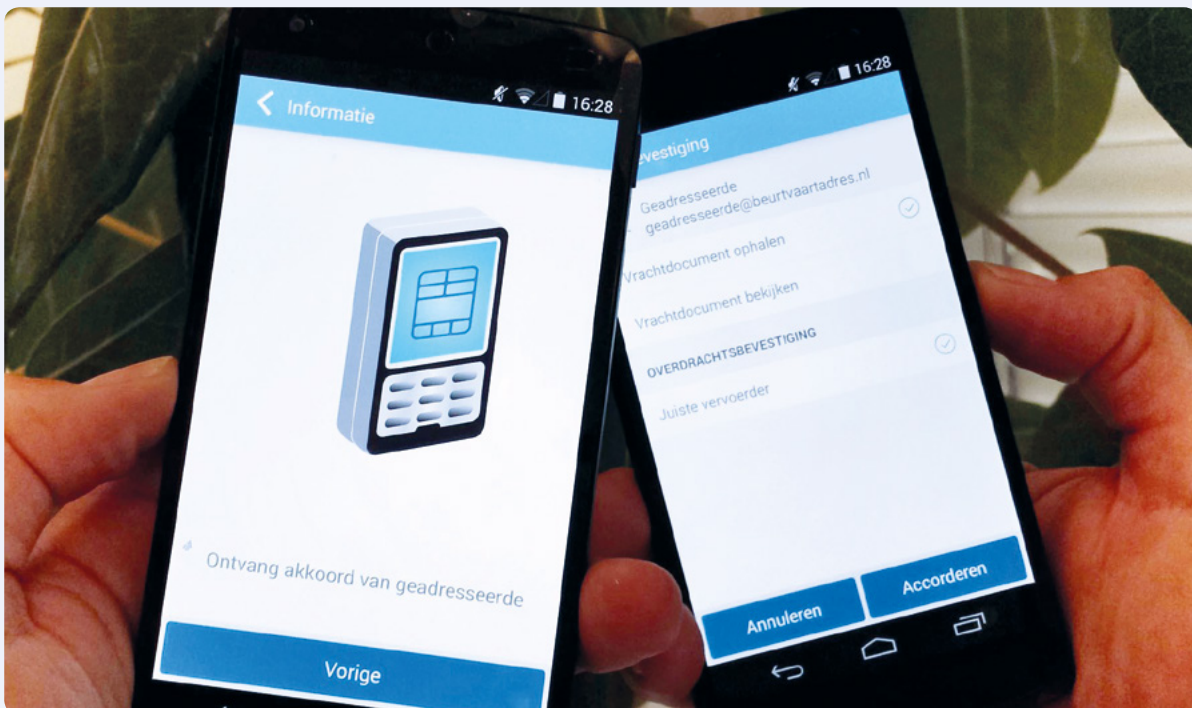
AMSTERDAM PRACTICAL TRIAL (APT) NORTH

Stakeholders   Province of North Holland, Municipality of Zaanstad, Amsterdam city region, Rijkswaterstaat and the Municipality of Amsterdam, Advin, Map Tm, DTV, Tecnolution, ARS, KXA, Viales, Quovasis ITS, Arcadis

Status   Completed

Area of realisation   Amsterdam region

Expenses   50 million euros/one-off/PPP

DESCRIPTION

APT North is investigating potential improvements to and further possibilities offered by the system of intelligent roadside technology previously piloted in phase 1. This trial is also testing the applicability of the system to other parts of the Netherlands. APT North is being carried out in the Municipality of Zaanstad: on the N516 and A8/A10 and the Verlengde Stellingweg.

TARGETS

The aim of the Amsterdam Practical Trial is to gradually move towards a future in which cars, traffic signals and information boards are connected and work together in an integrated way. In this way the APT is contributing to an improvement in traffic flows, a reduction in congestion and effective support for road users. APT North aims to test the cost-effectiveness of the Large-Scale Network-Wide Traffic Management (GNV) control concept, as well as the applicability of the concept to other parts of the Netherlands. The evaluations and other documents are available at www.praktijkproefamsterdam.nl/gereedschapskist

RESULTS

APT North is investigating potential improvements to and further possibilities offered by the system of intelligent roadside technology previously piloted in phase 1. This trial is also testing the applicability of the system to other parts of the Netherlands. The main result to emerge from APT North is that the system trialled is cost-effective and can also be used in many comparable scenarios in the Netherlands to improve traffic flows in busy situations and increase quality of life.
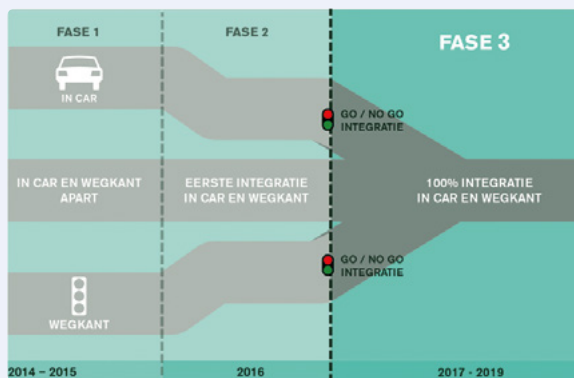
AMSTERDAM PRACTICAL TRIAL (APT) WEST

Stakeholders   Province of North Holland, Amsterdam city region, Rijkswaterstaat and the Municipality of Amsterdam, Be-Mobile, Inrix, TomTom, Fileradar, Transpute, Arane, MuConsult, Delft University of Technology
Status   Completed
Area of realisation   Amsterdam region
Expenses   Each of the parties has financed its own investment

DESCRIPTION

As part of APT West we have optimised the Large-Scale Network-Wide Traffic Management (GNV) control concept and measures (from Phase 1) and examined the possibilities for applying Floating Car Data.

TARGETS

The aim of APT West is to test improvements to the GNV control concept and assess the possibilities for applying

FCD. The evaluations and other documents are available at www.praktijkproefamsterdam.nl/gereedschapskist

RESULTS

One of the conclusions drawn is that FCD cannot yet be used for real-time traffic management.

For more information about the developments of FCD see paragraph 3.2 NDW Floating Car Data.

SMART CAMERAS ON THE A2

Stakeholders   Rijkswaterstaat, De Innovatiecentrale and ViNotion
Status   Completed
Area of realisation   South Netherlands
Expenses   186,000 euros/one-off/PPP

DESCRIPTION

As part of this project RWS, together with De Innovatie-centrale and ViNotion, are using existing and newly developed algorithms to analyse video images from existing rush-hour-lane cameras. With the help of these algorithms it is possible to identify vehicles or objects in the road. The study is examining whether the algorithms are (or can be made) smart enough to take routine work off the hands of road traffic controllers.

TARGETS

During the trial it is being investigated whether video image analysis using algorithms can be used in the operation of rush-hour lanes. At present a road traffic controller has to inspect a rush-hour lane before it can be opened. A smart camera could support the controller with this task or even take it over entirely, making it less time-consuming and therefore easier to operate and monitor the rush-hour lane.

RESULTS

The technology allows decisions to be taken more quickly and therefore improves traffic flows and safety. As the initial results have been positive, RWS now plans to take further steps that will allow the technology to be put into practice. It may also be possible to use it in other situations, e.g. to detect trucks that are too high before they enter a tunnel. For the time being the traffic controller will still perform the same role: while the system will make suggestions, the actual decisions will be taken by people.

INTERCOR

Stakeholders	Rijkswaterstaat, Province of Utrecht, Province of Noord-Brabant, in co-operation with relevant authorities from France, UK and Belgium. Co-financed by the European Union.
Status	In progress
Area of realisation	TEN-T Core Network road section from Europoort Rotterdam to the Belgian border (A15 & A16) and the section from Eindhoven to Venlo (A67). The next Core network section includes the A2 at the Leidsche Rijn Tunnel. Additionally, the port of Rotterdam is part of the project, as are the Moerdijk industrial area and the Venlo Trade Port.
Expenses	InterCor is a 3 year project of 30 million Euros co-financed by the European Union under the Connecting Europe Facility.

DESCRIPTION

The project aims to enable vehicles and related road infrastructure to communicate data through cellular, ITS G5 or a combination of both networks on road corridors through the Netherlands, Belgium, the UK and France. The project focusses on interoperability of services, while the overall goals of more efficient and more convenient mobility of people and goods.

TARGETS

InterCor is a recently started European project related to Connecting Europe Facility for Transport. This project, managed by Rijkswaterstaat, aims to harmonise services and connects existing corridors and initiatives in the Netherlands, France, UK and Belgium. The project uses hybrid communications, across long distances (cellular 3/4G LTE) as well as short distances (WiFi-P).
The InterCor project plans to achieve a sustainable network of C-ITS corridors providing continuity and serving as a TestBed for Day-One C-ITS service development and beyond.

In the Netherlands the project will build on services developed earlier for the Cooperative ITS Corridor-project. These will be coordinated with similar services in the French SCOOP@F project. Additionally, the provinces of Noord-Brabant and Utrecht are further developing and coordinating the following services: Truck Parking, GLOSA (related to traffic lights) and Tunnel Management Information. Several new, basic logistics C-ITS services will also be added. Consistent specifications for hybrid communications, security and test implementation will be further developed in cooperation with the national Architecture & Interoperability and Security meetings.

RESULTS

ITS G5 TESTFEST
The validation of a common set of specifications will be done by testing the interoperability of in-vehicle end-user devices and road side ITS stations from the four EU Member States. This will be done through a set of four interoperability TESTFEST events.

The first TESTFEST, focusing on ITS G5 services (Wifi-p), was held in The Netherlands co-organised by the InterCor project and the Dutch partners of the C-ITS Corridor. The TESTFEST was not limited to InterCor partners, but was open to any other interested parties. During real life traffic conditions on the A16 the Road Works Warning service was presented. Several so-called virtual test scenarios were made available, such as In-Vehicle Signage (IVS) services and tunnel scenarios, via fixed and mobile roadside units (RSUs) for testing in representative lab environment.

The massive amount of data gathered will be evaluated and used to refine the specifications of the system and the first services. The exchange of knowledge between road authorities and market parties, and mutually between market parties, was perceived as very positive.

The fact that the development of the technology has reached the next stage was demonstrated by the sudden interest of software companies for the TESTFEST and the presence of many international road authorities and suppliers to the automotive industry. We are all on the same page, which means that after this TESTFEST we can work towards a large scale roll-out of ITS-G5 services in Europe together.

The TESTFEST followed pre-deployments that have already taken place in the Netherlands, during which the services Road Works Warning with both fixed and mobile beacons, Prove Vehicle Data and Collision Risk Warning have been tested.

C -ITS CORRIDOR

Stakeholders	The Netherlands, Germany and Austria
Status	ongoing
Area of realisation	Rotterdam-Venlo motorway network A16-A58-A2-A76
Expenses	Approximately 6 million euros, one-off/public

DESCRIPTION

The EU member states the Netherlands, Germany and Austria have concluded a Memorandum of Understanding for the introduction of cooperative services on the corridor Rotterdam-Frankfurt-Vienna. The agreement provides the basis for standardised, cross-border, cooperative Intelligent Transport Systems (ITS) aimed at the future.

Cooperative ITS services are focussed on the exchange of information. The information can be exchanged between different vehicles, and between vehicles and the roadside infrastructure. Information exchange between vehicles is also a condition for the extensive automation of drivers' tasks. The self-driving car is the ultimate development of this.

Cooperation is key to the Cooperative ITS Corridor project. The project is being developed and implemented by the relevant authorities in the Netherlands, Germany and Austria. Rijkswaterstaat is also involving suppliers in the project and coordinates the work with centres of expertise, networking organisations and other related projects in the Netherlands.

TARGETS

- **Road Works Warning**
  The Road Works Warning aims to warn drivers about road works ahead using a secure ETSI G5 WiFi connection and the mobile telephone network.
- **Probe Vehicle Data**
  The Probe Vehicle Data services gathers anonymised sensor data (e.g. speed, braking force and weather conditions) from passing vehicles using secure ETSI G5 WiFi connection, for use in traffic management.
- **Collision Risk Warning**
  The Collision Risk Warning service warns road users about stationary vehicles used by road inspectors.
- **In-Vehicle Signage**
  The information displayed above the road on the VMS is also sent to passing vehicles, to further increase safety.

RESULTS

Every day, Rijkswaterstaat works on safe mobility in the Netherlands, not only by building new roads and waterways, but also by using the existing infrastructure more efficiently. Smart technology helps us to realise that. The introduction of cooperative services on the route between Rotterdam and the border with Germany will result in:

- Improved road safety
- Fewer incidents and traffic jams
- More efficient use of the road network
- Reduced CO_2 emissions

The project is in the pre-deployment phase, working towards roll-out when the automotive industry will provide cars with the necessary equipment.

3.4 PRIORITY AREA 3: ROAD SAFETY AND SAFETY OF FREIGHT TRANSPORT

In priority area 3 a wide range of initiatives are being taken, primarily at the instigation of the national government. Against the background of the negative trend in the area of road safety, the government is increasingly considering how smart solutions could be used to increase safety. Some of the key projects in this priority area concern the emergency services and aim to enable them to reach the scene of an incident more quickly. Another focus area is the safe use of smart services in vehicles.

As more and more vehicles are now connected to the internet and more and more mobility services are becoming available on smartphones, guidelines have been drawn up to prevent distraction inside the vehicle.

In addition to the projects outlined below, many of the projects from other priority areas also have an impact on road safety, as the same integrated approach is employed in all projects.

COMPASS4D

Stakeholders	31 partners from industry, research and the public sector
Status	Completed
Area of realisation	International
Expenses	10 million euros (5 million euros of EU funding)

DESCRIPTION

Road managers, suppliers of roadside infrastructure, carriers and their drivers, and other road users have been working together to make every journey as efficient, safe and comfortable as possible. Cooperative Intelligent Transport Systems (C-ITS) are a segment of the transport sector that is experiencing steady growth. C-ITS allows vehicles to communicate with other vehicles, other road users and the roadside infrastructure. C-ITS services advise.

TARGETS

The European Compass4D project focused on three services that will improve driver safety and comfort by reducing the number and severity of incidents, optimising the speed of the vehicle at intersections and preventing queues and traffic congestion. These three services are: Energy Efficient Intersection (EEI), Road Hazard Warning (RHW) and Red Light Violation Warning (RLVW). Compass4D services will also have a positive impact on the local environment by reducing the CO_2 emissions and fuel consumption of the vehicles concerned.

RESULTS

The Compass4D services were piloted in seven cities over the course of a year: Bordeaux, Copenhagen, Helmond, Newcastle, Thessaloniki, Verona and Vigo. The actual testing was preceded by a one-year implementation phase during which a collective effort was made by all consortium partners. In total, over the three-year project period, Compass4D installed equipment and implemented cooperative services for close to 300 roadside systems and traffic signals and in more than 600 vehicles, with over 1,200 drivers being involved in the test phase.

BIKESCOUT

Stakeholders   Municipality of Eindhoven, Heijmans
Status   Completed
Area of realisation Eindhoven
Expenses   420.000 euros/one-off/public

DESCRIPTION

Heijmans has developed an intelligent system that helps to increase the safety of cyclists. Unlike similar products, Bikescout constantly monitors the speed and distance of approaching cyclists. The system uses this information to calculate their arrival time and issues a warning to motorists. These warnings are given using LEDs in the road surface. Via a web application Bikescout also allows road managers to view data on the cyclists who pass the location in question, such as count data and average and maximum speeds.

TARGETS

- Effective and prompt warning of cyclists crossing a road thanks to individual speed measurement
- Increased perception of safety for the cyclist
- Fewer accidents
- Extremely robust and dimmable LEDs that can be fitted flush with the road surface
- Various methods of signalling possible
- Future-oriented thanks to in-car options

RESULTS

There have been so far 7 BikeScout installations placed and delivered nationally as internationally.

FLISTER

Stakeholders   ANWB, TomTom, Vodafone, Flitsmeister, Visio, Be-Mobile, Priodeck
Status   in progress
Area of realisation National
Expenses   Each of the parties has financed its own investment

DESCRIPTION

The Flister FM system: a mobile radio FM device for ambulances that interrupts car radios. Flister FM is also used to broadcast warning messages in tunnels. The Flister Sirenradar platform: a real-time online platform showing location data of emergency vehicles.

TARGETS

Providing real-time emergency vehicle data for safer traffic. Fast-moving emergency vehicles can cause unexpected reactions from car drivers. We develop early warning systems to warn traffic upfront. First, we developed the Flister FM system: a mobile radio FM device for ambulances that interrupts car radios. Flister FM is also used to broadcast warning messages in tunnels.

Then, we created the Flister Sirenradar platform: a real-time online platform showing location data of emergency vehicles. We enrich these data to be used as traffic information.

RESULTS

Our data are used by traffic apps, navigation device suppliers and car manufacturers. The SIRENRADAR platform is crucial for self-driving cars, which cannot navigate through traffic without knowing what to expect. We already help hundreds of emergency service vehicles make their way more safely and smoothly through traffic. In addition, we warn car drivers about upcoming roadworks to ensure professionals are well protected as they go about their work.

HUMAN FACTOR GUIDELINES FOR THE DESIGN OF SAFE IN-CAR TRAFFIC INFORMATION SERVICES

Stakeholders   TNO, SWOV, University of Groningen and Connecting Mobility, DITCM
Status   Completed
Area of realisation   National
Expenses   Around 12.000 euros/one-off

DESCRIPTION

The 'Human factor guidelines for the design of safe in-car traffic information services' are an expression of the Netherlands' ambition to take human factors into account when putting ITS applications into practice. Given the increasing number of traffic information services, including those offered via numerous smartphone apps, such an approach is essential. The guidelines give practical tips and examples to promote the safe design of these services, based on current scientific insights and the experiences of market parties. Public authorities can also refer to them in the requirements they set as clients when procuring new information services.
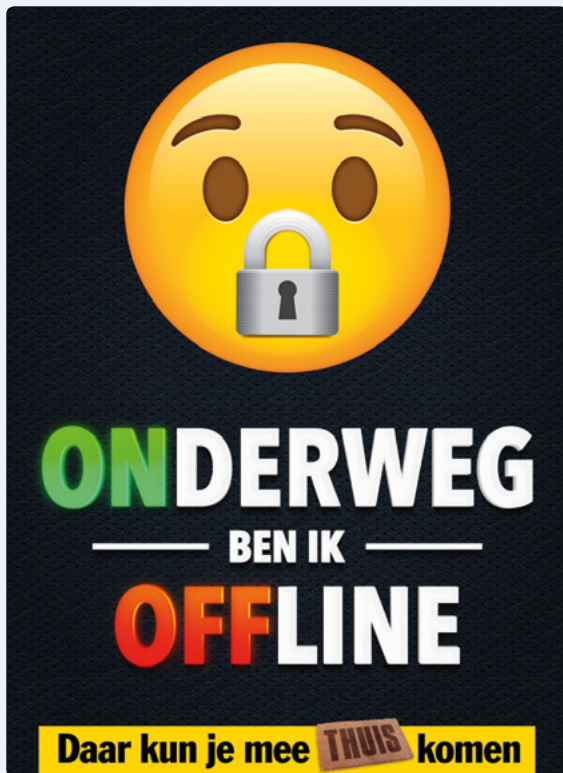
I am OFFline ON the Road. This is a behavior changing campaign by the government. You cannot drive safe with a smartphone in your hand.

TARGETS

The guidelines focus on in-car traffic information services, as we strongly believe that messages from applications not directly relevant to the driving task - such as social media apps - are distracting and will be detrimental to road safety. Hence, they should not be used while driving. Insurance companies, the Ministry and telecom providers are currently developing initiatives to minimise the use of information unrelated to traffic by drivers. Through the introduction of a 'driving mode' or 'cycling mode', social media messages are either disabled or road users are rewarded for not using their smartphone in traffic. Taking away distractions unrelated to traffic is helping to improve road safety.

RESULTS

Although these guidelines are not a formal regulation and their use is voluntary, several Dutch organisations - including parties from industry, national and local government and knowledge institutions, organised in the form of the Tactical Board of the Smart Mobility Round Tables - have expressed their commitment to using the guidelines in their projects and products. The guidelines are intended to serve as a basis for parties who want to deliver good services related to the collective ambition of increasing road safety. They are a living document that will be updated from time to time based on experience with new technologies and new research. Together we can improve road safety by designing safer in-car traffic information services.

3.5 PRIORITY AREA 4: INTEGRATION OF THE VEHICLE INTO THE TRANSPORT INFRASTRUCTURE

The number of projects in the area of cooperative systems is increasing rapidly (see also section 3.7 New developments). Relative to the previous Progress Report there has been more impact of the projects. These projects are also growing in terms of scale and greater attention is being paid to target groups other than motorised passenger transport, e.g. cyclists. There are more international partners involved. New projects are taking steps towards the actual implementation and scaling-up of solutions. A number of uncertainties also exist within area 4, mainly in the area of funding and business cases. Public investment is therefore needed in this phase and in many cases the initiative lies with the government.

AMSTERDAM PRACTICAL TRIAL (APT) SOUTH-EAST

Stakeholders	Province of North Holland, Municipality of Zaanstad, Amsterdam city region, Rijkswaterstaat and the Municipality of Amsterdam, KPN, Technolution, Be-Mobile-Flitsmeister, BrandMKRS, Goudappel-DAT Mobility, Twijnstra, Delft University of Technology, Eindhoven University of Technology, Connekt, Ditcm, Amsterdam Arena, Ziggo Dome, NDW, Connecting Mobility, University of Leuven, TNO
Status	In progress
Area of realisation	Amsterdam region
Expenses	Each of the parties has financed its own investment.

DESCRIPTION

The APT South-East project is investigating how traffic congestion before, during and after events can be reduced. The trial is making use of existing in-car technology and roadside systems to spread the volume of traffic between the various car parks in the area. In this way traffic is distributed right from the outset depending on the location and wishes of the motorist. The aim of the trial is to look into the possibilities of purchasing traffic management and traffic information services from specialist companies for four hours before, during and for two hours after an event. These companies would also make use of public systems during this period.

TARGETS

The trial was devised to test out a new approach to intelligent traffic management and travel information and advice with a view to reducing traffic congestion when more than one event is taking place in the ArenAPoort area. This should enable the numerous visitors to reach their destinations more quickly. The objective of APT South-East is to assess the reduction in traffic congestion achieved when a combination of major events is taking place by enabling road managers and a consortium of businesses to work together as equal partners. The evaluations.

RESULTS

Research conducted by MuConsult has revealed that the cost-benefit ratio of the management of traffic control systems is 1:20. This refers to social benefits, calculated on the basis of lost vehicle hours avoided. The results of the trial have also been good. Almost all of the 200,000 visitors to the concerts held over Whit weekend in 2016 arrived at their concert on time. Shortly before the concerts began there were no longer any queues on the approach routes. In addition, the trial demonstrated that it is possible, from a technical and system engineering perspective, for private services to be provided in the area of traffic management and travel information.

SHOCKWAVE TRAFFIC JAMS ON THE A58

Stakeholders	Consortia of market parties, Province of North Brabant, Rijkswaterstaat and the Ministry of Infrastructure and the Environment
Status	Completed
Area of realisation	Brabant
Expenses	18 million euros/one-off/PPP

DESCRIPTION

From early 2014 through to the end of 2016 the thirty parties involved in the Spookfiles A58 (Shockwave traffic jams on the A58) project developed, implemented and tested a cooperative vehicle/roadside system, including an initial service. A wealth of knowledge and experience - relating to behaviour, data, security, cooperation, organisation and more - was built up in the process of achieving this concrete result. The cooperative system, the application and the lessons learned together make up the abundant harvest yielded by the three-year Spookfiles A58 project.

TARGETS

Two consortia of six companies developed a service designed to prevent shockwave traffic jams and carried out field tests, using the 17-kilometre section of the A58 motorway between Eindhoven and Tilburg as a pilot route. The system delivered and the service were tested using long-range communication (3G/4G) and 'cooperative' roadside/vehicle communication via WiFi-P. For these tests the A58 pilot route was equipped with 34 WiFi-P beacons.
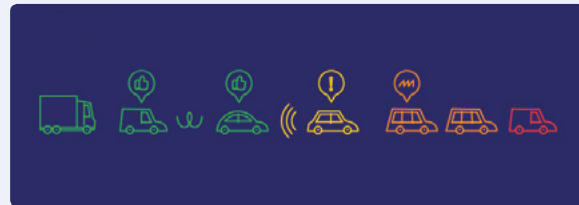
RESULTS

Spookfiles A58 was completed at the end of 2016. The tests demonstrated that the system delivered works and that the service does indeed have the potential to reduce shockwave traffic jams. At least as relevant, however, was the conclusion that the Spookfiles A58 system can be continued and is upscalable, transferable and 'privacy-proof'.

Thanks to the smart architecture, the system developed is not a custom system that is only of use on the A58, but an open and generic system that is easy to expand both geographically (suitable for other regions) and functionally (suitable for other services).

DAIMLER FUTURE BUS

Stakeholders   Province of North Holland, Ministry of Infrastructure and the Environment, Municipalities
                     of Haarlem and Haarlemmermeer and Vialis
Status   Completed
Area of realisation Amsterdam region
Expenses   Each of the parties has financed its own investment

DESCRIPTION

German automotive firm Daimler AG opted for the bus lane between Schiphol and Haarlem as a location to present its concept for a self-driving bus. Under the name 'project Independence' it is conducting the first operational test of a (highly) automated bus travelling on a road where other traffic is present.

TARGETS

It is now possible for the first time to operate a self-driving bus over a long distance on a route where ordinary traffic is present and on which an intersection controlled by traffic signals has to be negotiated. The infrastructure helps the self-driving vehicles to drive safely and efficiently.

RESULTS

Daimler's showcase project is in keeping with the Province of North Holland's policy of using smart technologies (smart mobility) to improve traffic flows and safety on its roads. Developing self-driving vehicles and testing them in an urban environment also forms part of this policy.

GRAND COOPERATIVE DRIVING CHALLENGE 2016 (GCDC)

Stakeholders   Province of North Brabant
Status   in progress
Area of realisation International
Expenses   25,000 euros

DESCRIPTION

GGCDC 2016 is an innovative and competitive demonstration on the A270 between Helmond and Eindhoven that is pitching ten European teams against each other. The demonstration is a combination of vehicle automation (enabling vehicles to become self-driving) and communication both between vehicles and with roadside systems.

TARGETS

With the i-GAME event and GCDC 2016 an important advance is being made in the cooperative automation of vehicles and in speeding up their implementation. The underlying aim is to increase road safety, improve traffic flows and reduce fuel costs and emissions.

RESULTS

The Swedish team from Halmstad University won the first prize, followed by the German team KIT AnnieWay and the Swedish KTH truck team. The three winning teams received an NVIDIA Jetson TX1 developer kit, a development platform for Deep Learning and Artificial Intelligence. The overall winner was rewarded with a month of scientific research support on subjects related to cooperative automated driving, two weeks of research consultancy on subjects related to cooperative automated driving and a masterclass on cooperative automated driving at the winning institute, including technology demonstration on site, by co-organisers TU/e and TNO representing a value of 25,000 euros.

FLO

Stakeholders   Municipality of Utrecht, Municipality of Eindhoven, Springlab
Status   In progress
Area of realisation   Utrecht, Eindhoven
Expenses   Approximately 35.000 euros per Flo speed advisor installation excl. cabling, in this pilotphase.

DESCRIPTION

Thanks to Flo, cyclists will be able to catch a green light more often, improving the flow for cyclists in traffic. Flo measures the speed of a bicycle and adapts the advice given accordingly. In this way every cyclist receives personal advice, increasing the chances that the lights will be green when he/she reaches them! Four symbols can appear on the Flo screen. Each of these represents specific advice that will help the cyclist catch a green light.

TARGETS

To prevent cyclists jumping red lights. Flo's main aim is to make cycling more fun. We do this by removing the greatest frustration for the cyclist: waiting at a red light.

RESULTS

Flo has been developed in collaboration with partners who have many years of experience in the field of traffic control systems. It can be connected to any intersection or traffic control system, irrespective of the technology and supplier.

fietsflo.nl
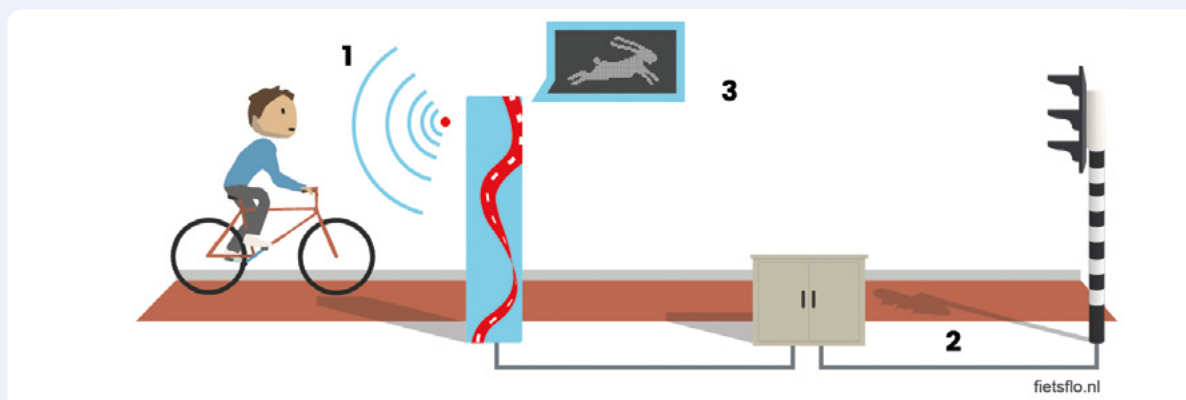
TRUCK PLATOONING

Stakeholders	Rijkswaterstaat, Ministry of Infrastructure and the Environment, TNO, TLN, Rotterdam Port Authority, DAF
Status	In progress
Area of realisation	National, international
Expenses	Each of the parties has financed its own investment

DESCRIPTION

The transport sector alone is responsible for around 25% of all CO_2 emissions within the EU. This figure needs to be reduced substantially, by as much as 60%. One of the innovations that can help to make this possible is truck platooning. This involves electronically linking trucks with the help of GPS, WiFi and radar. The speed and route are determined by the truck at the front and the other trucks follow it automatically at a close distance, without any action required on the part of the driver. This frees up space on the road for other vehicles. Truck platooning therefore promotes the flow of traffic, improves road safety and allows savings to be made in terms of fuel and CO_2 emissions as a constant speed is maintained.

Platoons of two to three trucks will be driven on various roads in the Netherlands. The purpose of these real-life cases is to gather more experience so that truck platooning can move into the next phase of the innovation cycle.

TARGETS

The Dutch business community and transport sector believe that truck platooning offers a wealth of opportunities. Agreements have been made with numerous parties, including Peter Appel Transport, Simon Loos, Unilever, Albert Heijn and Jumbo, but also the Top Sector Logistics and ANWB, to examine in practice next year how truck platooning could be used and integrated into their logistic processes.

RESULTS

The transport sector is constantly working on innovations with the aim of improving road transport. This development is a good example of such an innovation. It is more economical, safer and more efficient than conventional driving. With this trial the transport sector is demonstrating its ambition of ensuring the Netherlands remains a global leader in the field of logistics in the future.

3.6 PRIORITY AREA 5: DATA PROTECTION AND LIABILITY

Many of the projects described under the previous areas have been implemented and scaled up to a significant extent. As the scale that applies to many of these services is Europe-wide, however, full implementation has not yet been achieved. Although the nature of projects is changing from smaller bottom-up initiatives to more coherent (partially guided) developments linked to the European agenda, there is also an increasing need for both the government and private parties in the Netherlands to focus on prerequisites. These are being tackled nationally within the DITCM programme.

SMART MOBILITY COMMUNITY FOR STANDARDS & PRACTICES

Stakeholders	Businesses, public authorities, knowledge institutions and interest groups
Status	In progress
Area of realisation	National
Expenses	Public/private

DESCRIPTION

The Netherlands hosts a Smart Mobility Community for Practices and Standards. This community consists of key stakeholders with the mandate of industrial partners, government agencies, and knowledge institutes. Together, they develop conditions and harmonise project results to enable the next step towards deployment of Smart Mobility, by working on topics such as cybersecurity, standardization and human factors. The Smart Mobility Community for Practices and Standards is an efficient platform to develop a framework for what concerns the Dutch ITS community.

TARGETS

The main target is cooperating and sharing knowledge to accelerate the implementation of Smart Mobility on a bigger scale.

Actual projects:
How can I prepare for cyber crime? What is the amount of information a driver can handle? Which standards are available? How to deal with the big amount of data and privacy issues? What are the effects of upscaling applications and users on throughput and safety?

Topics are inspired by actual Smart Mobility projects in the Netherlands and beyond. Use cases to be rolled out in the Netherlands and in Europe are the common thread in conversation. These use cases are prioritised by stakeholders and in relation to international scoping, business interest and governmental strategy. In use cases such as Shockwave mitigation and Green Light Optimal Speed Advise, the Round Tables work on security and privacy issues, architectural choices, profiles, measuring methods and optimising human comfort and social and economic effects. They are willing to bring their experience to the table and invest in a shared framework. Results of the Round Table discussions are collated by a Tactical Board and used in new projects. Through this working process, we are able to optimise our input for European workforces and respond quickly to international issues, with broad support.

RESULTS

Development of this framework is not a national issue, but an international challenge. The Round Tables take on what is international available, and enrich this with national findings. The participants work closely together with international stakeholders, organised like the EU C-ITS Platform of standardisation, and by liaisons to important projects on large scale implementation, like the ITS Corridor and InterCor Projects.

3.7 NEW DEVELOPMENTS

This section presents an overview of new developments. It also includes a number of projects that were recently launched and are worthy of mention.

NAME	PRIORITY AREA	PLAN
SimSmartMobility	Priority Area 1	SimSmartMobility is an open platform and Smart Mobility simulation tool. The tool offers a quick insight into the impact of a service on accessibility or road safety in a particular city or region, for example.
IAT	Priority Area 1	The Dutch Government, 20 Dutch and German businesses, Delft University of Technology, HAN University of Applied Sciences and the German Institute for Climate Protection, Energy and Mobility (IKEM) will continue to develop self-driving vehicles in Gelderland and Germany for at least another three years. This is taking place as part of the Interreg project International Automated Transport (IAT).
Intercor	Priority Area 4	The Road Works Warning service is intended to warn motorists about roadworks on their route. Warnings are transmitted using a secure short-range ETSI G5 connection (also known as WiFi-P) and the 3G/4G mobile network. Information such as the exact location of the works and the lanes available is sent to passing vehicles equipped with a WiFi receiver via roadside beacons. This service involves two data streams: connected and cooperative.
MobilitymoveZ.NL	Priority Area 2,3,4	The Province of North Brabant, together with the Ministry of Infrastructure and the Environment, the Directorate-General for Public Works and Water Management and the Municipalities of Eindhoven, Helmond and Tilburg, has initiated a public-private partnership under the name MobilitymoveZ.NL. The aim of MobilitymoveZ.NL is to offer parties from the private and public sectors an insight into promising mobility concepts and identify the conditions that need to be met to scale them up.
Nissan traffic signal trial	Priority Area 1	For the past two years the Province of North Holland has been working with Nissan California, which alongside Tesla and Google is one of the market leaders in the area of electric cars and smart mobility. Nissan believes there is a promising future for self-driving cars that can communicate with smart traffic signals.
Smart Shipping	Priority Area 2	We are standing at the dawn of a new era in shipping. While knowledge and skills remain crucial, technology is becoming an increasingly decisive factor. Here we are talking, for example, about the remote control of vessels, the smarter sharing of information, the optimisation of waterway maintenance or (almost) fully automatic navigation. These developments create opportunities to take challenging steps forward in the areas of sustainability, safety and efficiency.
Vehicle data practical trial	Priority Area 1	The aim of this project is to collect more data from vehicles and to use these data smartly to further improve road safety and traffic flows.

NAME	PRIORITY AREA	PLAN
iWKS	Priority Area 2	The aim of iWKS is to facilitate the transition to Smart Mobility and achieve cost savings at roadside traffic control stations. Savings have been achieved by: • separating software and hardware, • employing components with standard network technology (IP) and • experimenting with alternative sensors (including Floating Car Data). In 2018 RWS plans to test this system as part of a practical trial involving Floating Car Data, amongst other things.
Socrates	Priority Area 4	Cooperation and coordination in the area of traffic management services between public traffic control centres, back offices of service providers and the automotive industry. This is a project submitted to the EU under a call for proposals. The aim is to offer better advice, warnings and routes to road users via roadside and in-car technology (public-private coordination), improve monitoring and support traffic control measures at traffic control centres. In the Amsterdam Metropolitan Region the tests are being organised with BMW and almost all service providers.
Amsterdam Practical Trial, COP	Priority Area 2	As part of the APT COP project public and private parties are working together to develop a Common Operational Picture for public-private traffic management. A website is being used to present all relevant public and private traffic information and traffic management measures (including scenarios), as well as other management information that can be used to support decisions. This is being put into practice during four large-scale multi-events in the events district of South-East Amsterdam.
Accessible Amsterdam feasibility study	Priority Area 2	Over the next ten years the Amsterdam region will have to deal with roadworks on a very large scale. These will put significant pressure on the accessibility of the wider Amsterdam region. A wide range of measures has been developed, including traffic management and smart travel. APT is investigating the feasibility of applying the APT package of measures within road managers' regular work processes. If the outcome is positive, it is likely that these measures will be implemented by road managers.
Smartwayz	Priority Area 2,3	Under the banner SmartwayZ.NL (previously 'Bereikbaarheid Zuid-Nederland' ('Accessibility South Netherlands')) public authorities, market parties and knowledge institutions, as well as other stakeholders, are working together closely to improve the accessibility and economy of the South Netherlands. The ambition is to create the smartest road network in Europe, one that extends into the region's cities.

4 Impact of ITS

Through the use of ITS measures public authorities and businesses contribute positively to accessibility, safety and air quality. As many of the ITS developments described are still in the pilot phase and are being tested on a small scale, determining the impact of ITS at a macro level is no easy task. In this chapter an attempt has been made to present this impact as far as possible. For this purpose use has been made of the ITS KPIs determined at European level. At micro level the results of projects are presented. Although the scale of these project results is insufficient to have an impact at macro level, they nevertheless provide a good insight into the potential impact of ITS.

TENT-T 1.1 DATA COLLECTION MADE AVAILABLE VIA NDW 100%	TENT-T 1.2A INCIDENT DETECTION CAMERA'S AND ROAD INSPECTORS 100%	TENT-T 1.2B TRAFFIC MANAGEMENT MADE AVAILABLE VIA NDW 100%	TENT-T 1.2C C-ITS MOSTLY PILOTS 0%	TENT-T 1.3A REAL TIME TRAFFIC INFORMATION VIA NDW AND COMMERCIAL SERVICES 100%	TENT-T 1.3B DYNAMIC TRAVEL INFORMATION VIA NDOV 100%	TENT-T 1.3C FREIGHT INFORMATION PARKING SPACE UTILISATION 100%
OTHER MOTORWAYS 1.1 DATA COLLECTION MADE AVAILABLE VIA NDW 100%	OTHER MOTORWAYS 1.2A INCIDENT DETECTION CAMERA'S AND ROAD INSPECTORS 100%	OTHER MOTORWAYS 1.2B TRAFFIC MANAGEMENT MADE AVAILABLE VIA NDW 100%	OTHER MOTORWAYS 1.2C C-ITS MOSTLY PILOTS 0%	OTHER MOTORWAYS 1.3A REAL TIME TRAFFIC INFORMATION VIA NDW AND COMMERCIAL SERVICES 100%	OTHER MOTORWAYS 1.3B DYNAMIC TRAVEL INFORMATION VIA NDOV 100%	OTHER MOTORWAYS 1.3C FREIGHT INFORMATION PARKING SPACE UTILISATION 100%

4.1 ITS KPIS

DEPLOYMENT

The request has been made to distinguish between the following road networks: a- TEN-T (in NL ~1,000 km of the main road network) and b- other motorways (in NL ~ 1,400 km).

KPI 1.1 (traffic data collection): Commissioned by various road authorities in the Netherlands (cities, provinces and Rijkswaterstaat), the National Data Warehouse for Traffic Information-NDW-collect real-time traffic data at 33.000 locations, along 8.300 kilometres of road, including all TEN-T and other motorways:
• 2.000 kilometres of main local roads in cities,
• 2.885 kilometres of provincial roads and
• 3.300 kilometres of motorways and other main roads.

Loop detectors are the primary means for traffic data collection on motorways, in line with the high data quality requirements implied by current legislation (for instance on air quality and noise) and for policy accountability.

KPI 1.2a (incident detection): Rijkswaterstaat performs incident management on all motorways in the Netherlands on a 24/7 basis. Over 3000 cameras are positioned along the motorway network, used by traffic operators in the traffic control centre to detect and analyse incidents. On roads equipped with signalling systems (approximately 35% of the motorway network), incidents are detected automatically by the present Automated Incident Detection (AID) system and reported to the traffic operator in the traffic control centre. In addition, about 250 road inspectors are deployed to monitor the situation on the road and to assist during incidents.

KPI 1.2b (traffic management): Traffic management is performed on the entire motorway network on a 24/7 basis by traffic operators in 5 regional and 1 national traffic control centres. For this purpose, traffic operators can deploy a wide variety of traffic control measures. More specifically, the motorways in the Netherlands are equipped with 150 traffic lights, 430 dynamic route information panels (DRIPs), 5600 signalling/VMS locations, 106 ramp metering locations and over 3000 cameras.

KPI 1.2c (C-ITS): C-ITS services are currently only provided within pilots and have not yet part of standard traffic management procedures.

KPI 1.3a (real-time traffic information): All real-time traffic data collected for the motorway network is made available as open data by NDW for both commercial service providers and road authorities. Data is updated on a minute basis and includes local intensity, average speed, realised or predicted travel time, vehicle type, incident locations, traffic jams and road works.

KPI 1.3b (dynamic travel information): The National Data Warehouse for Public Transport (NDOV) provides real-time and static (multimodal) travel information as open data for both commercial service providers and road authorities. These data include planned timetables, real-time status information (expected arrival times, delays, cancelled trips) and ticket rate information for buses, trams, metro, trains and other public transport.

KPI 1.3c (freight information): The National Access Point ITS contains static information of parking space utilization of more than 330 truck parking spaces. In addition to general information such as name and coordinates, the database contains information about facilities at the truck parking space (toilets, lighting, etc.). Some of the truck parking spaces already have real-time information about parking space utilization.

PERFORMANCE

Congestion on the main road network has a negative impact on journey times/accessibility. There are various causes of congestion, which can be roughly divided into three categories in the Netherlands: shockwave traffic jams, traffic jams due to incidents and traffic jams resulting from a capacity problem. The Netherlands Institute for Transport Policy Analysis (KiM) (part of the Ministry of Infrastructure and the Environment) determines the impact of various measures annually. These effects on the overall main road network are presented in the figure below. Here it can be seen that traffic management (ITS) contributes to a 9% reduction in lost travel time. Note that this effect is based only on the impact of ramp metering and dynamic route information panels whereas the additional effect of other traffic management measures – for example, incident management – is not yet taken into account. Moreover, this reduction in lost travel time should be regarded as an addition to the savings already achieved as a result of traffic management measures implemented before 2000 (which are still in use today).
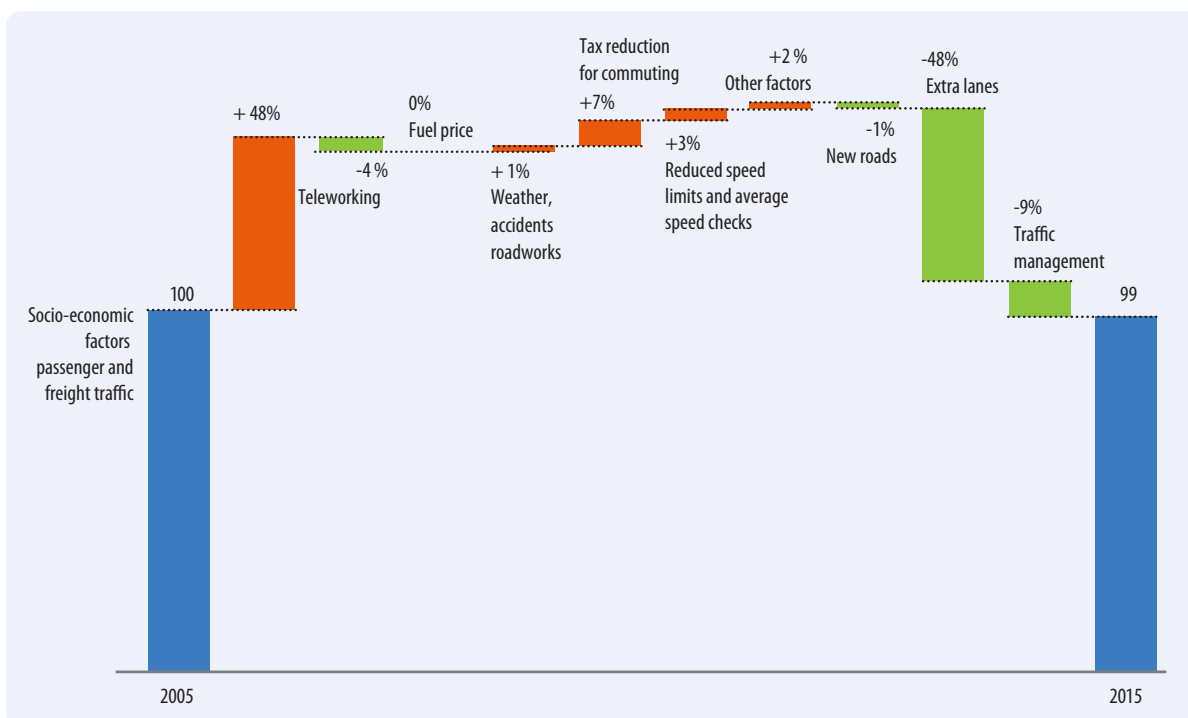

Figure 4: factors with an impact on lost travel time - Source: Mobiliteitsbeeld 2016, KiM

CHANGE IN NUMBER OF ROAD ACCIDENTS RESULTING IN DEATH OR INJURIES

Figures are available in the Netherlands on the number of road accidents and the resulting deaths and injuries. The introduction of the lane control system in the past, which now covers almost half of the motorways, reduced the number of head-tail collisions and injuries by 30%-40%. However, it is not known what contribution ITS has made in general to reducing the number of deaths and accidents. Thirty two organisations in the area of road safety, including the Public Prosecution Service, the Dutch Association of Insurers and ANWB, are requesting that attention be paid to the increased use of innovative technology, such as automatic braking, navigation and radar systems, to reduce the number of fatal road accidents.

CHANGE IN TRAFFIC-RELATED CO_2 EMISSIONS (ROAD KPI)

The Netherlands is committed to the European target of reducing CO_2 emissions by 40% by 2030 and by 80% to 95% by 2050 compared with their 1990 level. This EU target has been adopted in the Energy Agreement for Sustainable Growth of the Social and Economic Council of the Netherlands (SER). A specific target of a 17% reduction in CO_2 by 2030 and a 60% reduction by 2050 relative to 1990 levels applies to the traffic and transport sector. All ITS activities that could contribute to this cut in CO_2 emissions, but also to a reduction in particulates, are welcomed within the Dutch plans.

FINANCIAL BENEFITS

According to calculations of KiM based on various sources, the social costs of traffic jams and delays on the main road network in the Netherlands (price index 2010) for 2015 are 2,33 to 3,03 billion euros. In addition, traffic management (ITS) contributes to a 9% reduction of travel time losses, according to the calculations by KiM. The reduced travel time losses thus correspond with a yearly amount of 0.09 * 2,33 to 3,03 billion = approximately 210-272 million euros. Compared the overall yearly expenditure on ITS and DTM of 164 million euros, a cost-benefit ratio varying between 1: 1.3 and 1: 1.7 results. In other words, every euro spent on traffic management on the motorway network in the Netherlands delivers benefits for society worth 1.3-1.7 euros. Cost-effectiveness calculations have been performed on other parts of the road network. For example, in 2010, the Province of North Holland conducted a study into the cost-effectiveness of using traffic management. This revealed that traffic management makes a contribution of around 18% to stemming the increase in the number of lost vehicle hours on the provincial road network, with a cost-benefit ratio of 1:2.5. Similar cost-benefit ratios are expected to apply to other provinces.

4.2 PROJECT RESULTS

To gain a greater insight into the potential contribution of ITS, the Netherlands is devoting considerable attention to evaluating pilots. In the case of the projects described in Chapter 3, the results are presented for each project, where these are known.
There are a number of particularly striking results:
- **Amsterdam Practical Trial (APT) South-East**
  In addition, the trial demonstrated that it is possible, from a technical and system engineering perspective, for private services to be provided in the area of traffic management and travel information.
- **Partnership Talking Traffic**
  Realizing on a very short notice such an impact, replacing 25% of all existing Traffic Control Systems in the Netherlands by intelligent Traffic Control Systems (iVRI) wil be an impressive performance.
- **Optimising Use Programme**
  This programme has an ambition to reduce travel time in rush hour with 10%. Twelve regions implementing about 350 measures. these actions led to a decrease of 19% of traffic jams in rush hour on 420 Optimising Use trajects. Together the regions have reached about 48.000 rush hour avoidances per avarage weekday.
- **Shockwave traffic jams on the A58**
  Spookfiles A58 was completed at the end of 2016. The tests demonstrated that the system delivered works and that the service does indeed have the potential to reduce shockwave traffic jams.

At least as relevant, however, was the conclusion that the Spookfiles A58 system can be continued and is upscalable, transferable and 'privacy-proof'. Thanks to the smart architecture, the system developed is not a custom system that is only of use on the A58, but an open and generic system that is easy to expand both geographically (suitable for other regions) and functionally (suitable for other services).

In addition to the results in the area of accessibility, the Netherlands is also focusing on the transition described in Chapter 2. To this end a national overview has been created in which the progress of ITS projects, services and facilities is presented and linked to the transition. This overview, managed by the Connecting Mobility action programme and Connekt, is also linked to the recently launched ITS Observatory. The ITS overview comprises over 100 projects and services in the field of ITS in the Netherlands and offers interesting insights into the promise of ITS, as presented in the dashboard opposite. You can find the overview on itsoverzicht.connectingmobility.nl/dashboard

The following picture emerged from a recent study on the satisfaction of users of information services. It is clear that the information distributed via smartphone apps, navigation systems and the internet is increasingly being found.

COMPARISON OF RESULTS	2011	2015
Channels used pre-trip	Internet on laptop/PC (57%), teletext (39%), radio (36%), internet on smartphone (20%)	Internet route info (55%), internet congestion info (28%), route navigation (25%), radio (22%)
Channels used on-trip	Radio (83%), electronic signs (25%), navigation with congestion info (24%), RDS via radio (23%)	Radio (46%), electronic signs (39%), route navigation (38%), blue signs (37%), navigation with congestion info (28%)
Moment of consultation	Mainly during travel	Mainly before travel
Internet use en route	9%	30%
Trend	Decrease in radio and teletext Increase in tablet and app	Greater mix of services Conservative use of radio, electronic signs and route navigation

As you can see more than half of the road users owns a navigation system and even 30 percent owns a system with real-time traffic information. This contributes to a high penetration rate for in-car systems.
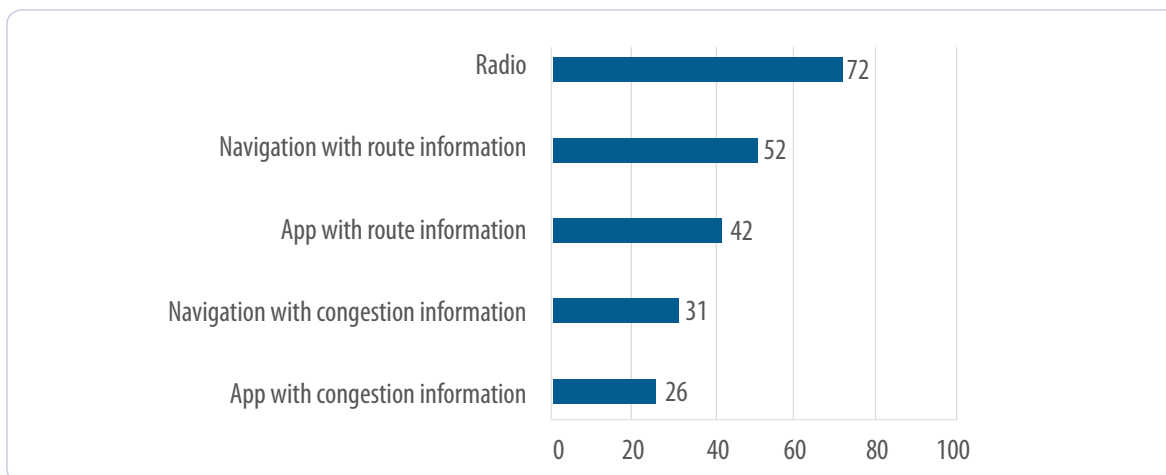
Figure 5: ownership of information systems

It is obvious that road users use blue signs, navigation systems and radio on-trip and mainly uses applications and websites to check route and information pre-trip.
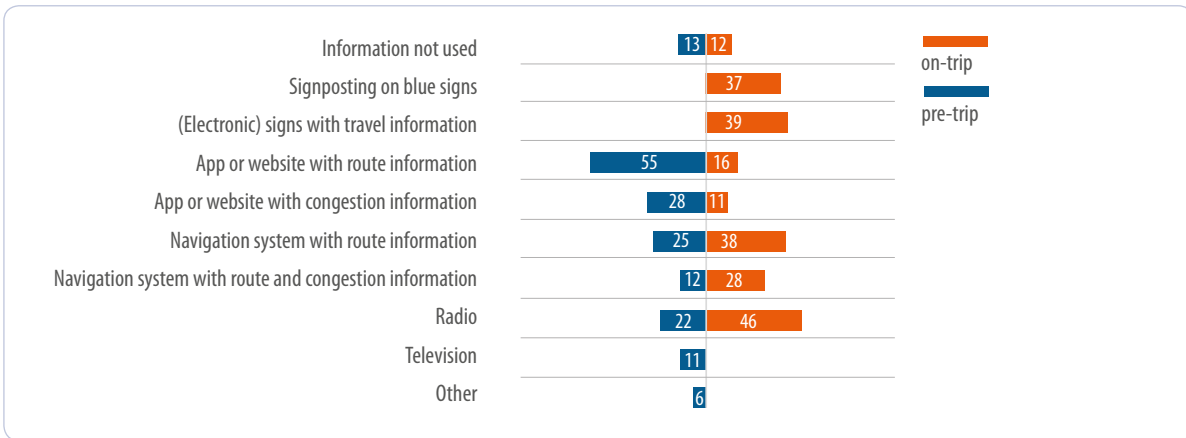
Figure 6: use of systems pre-trip or on-trip

The first use cases are already implemented thanks to the availability of data like maximum speed and traffic jam detection.
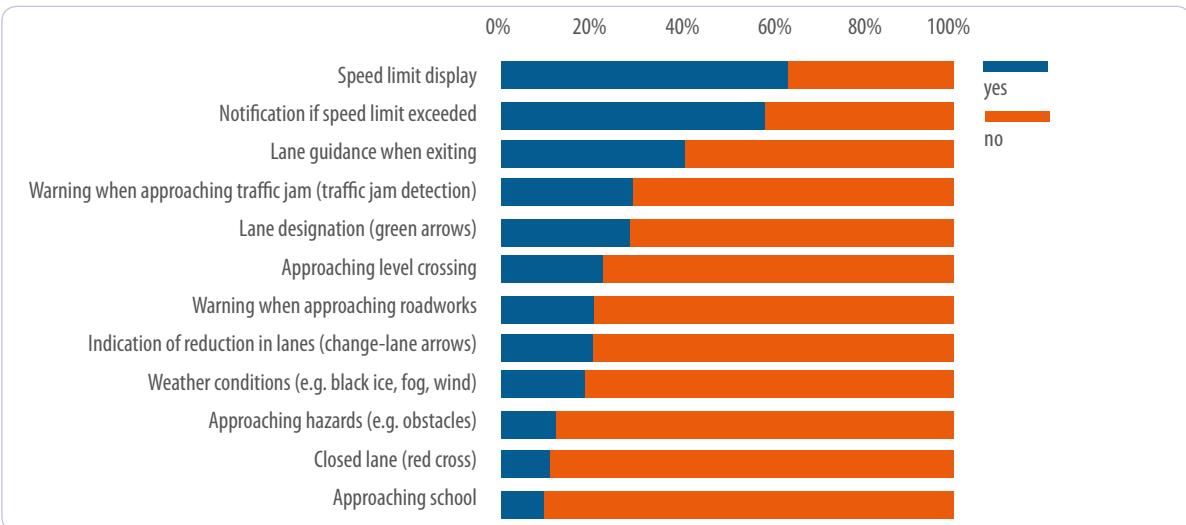
Figure 7: access to additional information in the vehicle

As shown in the figure, road users rate the traffic related information services by applications a bit higher than the traditional information services by signposting on blue signs.
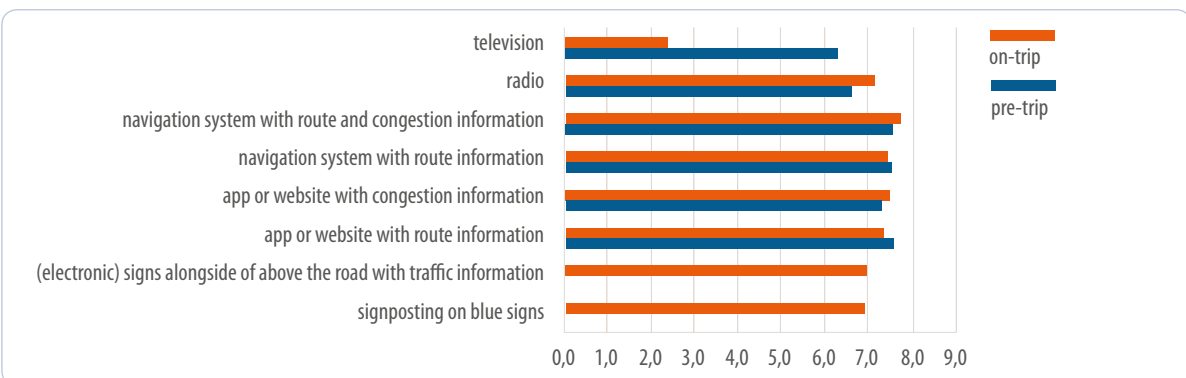
Figure 8: traffic related information services

5 Closing remarks, conclusions and recommendations

5.1 GENERAL

It is clear from the information reported in the previous chapters that the Netherlands is explicitly focusing on implementing Intelligent Transport System projects and activities with a view to achieving its policy objectives in relation to traffic flow, safety and quality of life. In recent years public-private partnerships and maximum openness and availability of data have been discernible as key focus areas.

5.2 WHAT CAN THE NETHERLANDS OFFER?

HUMAN FACTORS IN RELATION TO ITS

In recent years the Netherlands has given increasing consideration to human factors. Within this area it is examining both how people react to ITS services and how these services can be used responsibly. The knowledge acquired through projects is being brought together and made available in the form of guidelines. One of the most recent guidelines concerns the safe design of traffic information services in vehicles. The Dutch Government is also devoting a great deal of attention to the safe use of ITS services. It has an active policy of discouraging people from using their smartphone while cycling, for example, and road users are made aware of the dangers of using smartphones while driving. The Netherlands is happy to share this knowledge with other Member States with a view to further improving road safety.

FOCUS ON URBAN AREAS

In addition to the policy plans formulated within the Dutch Government, an increasing number of regions and metropolitan areas are also developing their own ITS plans. This is because the regions are becoming increasingly aware of innovations in this area and the opportunities they offer to tackle problems such as space shortages, accessibility and air quality. These regional plans are highly ambitious and dynamic, thanks to the combination of the local issues they address and the engagement of citizens.

Analyses have shown that over the coming years greater efforts will be needed to tackle the problems in urban areas. That is why the Netherlands is focusing increasing attention on implementing ITS in these areas and acknowledges the importance of involving the regions in the cooperation at European level.

INTEGRAL COLLABORATION ON HARMONISATION

Although the deployment of ITS manifests itself in urban areas, the importance of international harmonization is essential for achieving a leap in connected and automated driving. Such international harmonization calls for a coordinated European approach. This approach depends not only on government, but also on collaboration with industry in the Automotive, Telecom and IT sector. In the Netherlands we have good experiences with a coordinated European approach such as the Declaration of Amsterdam and the Data Taskforce.

5.3 SPECIFIC QUESTIONS AND WISHES ADDRESSED TO THE EUROPEAN COMMISSION

AUTOMATION AS AN ELEMENT OF THE REPORTING

The guidelines relating to the ITS Plan for each Member State were drawn up in 2011. Over the last six years there have been a number of innovations in the area of smart mobility, which have been implemented and tested in the Neterlands. Take for example several pilots on Mobility-as-a-Service in Rotterdam and Amsterdam, the usage drones for inspection and surveillance. These innovations are supported by several trends such as an increase in sales of electric vehicles (+50%) and usage of carsharing (+55% growth in the major cities of the Netherlands).

The biggest development, perhaps even a revolution, in our industry is the selfdriving vehicle. The European vision is that self-driving vehicles will develop hand in hand with greater connectivity between vehicles and the infrastructure. Automation could therefore also be covered in this reporting to obtain a more complete picture of developments in the area of ITS. For this reason the Netherlands advises that vehicle automation should be included in the guidelines for subsequent reports.

KPIS FOCUSING MORE ON THE TRANSITION

In this progress report use has been made for the first time of the European ITS KPIs to provide an insight into the contribution that ITS is making to accessibility, safety and air quality. The KPIs focus on deployment and it proved difficult for the Netherlands to tie them in with its policy lines. In the Netherlands we are looking more specifically at the transitions taking place, such as the transition from roadside collection systems to the purchase of floating car data. This transition cannot currently be made visible with the current set of ITS KPIs, but offers interesting insights into the progress of ITS in the Netherlands. The Netherlands therefore advises the European Commission to expand the solid basis provided by the current ITS KPIs to include KPIs offering an insight into the transitions.

COOPERATION BETWEEN PUBLIC AND PRIVATE SECTOR

The Netherlands is setting the example as a country where projects and services are being realised in the form of public-private partnerships. Steps are increasingly being taken to make these collaborations future-proof and less project-dependent. The Talking Traffic Partnership and Amsterdam Practical Trial are examples of such steps. For the practical trial a public-private partnership has been entered into for the first time that involves no flows of funds between the parties. The Netherlands will be pleased to share its experiences of this new form of collaboration with the other Member States and the European Commission.

TRENDS

In addition to the ITS activities described above, there are numerous developments taking place in the field of smart mobility. The most notable trends in evidence in the Netherlands are presented in this section.

DEVELOPMENTS IN THE AREA OF CONNECTIVITY

Based on the following figures and trends, connectivity is one of the most important carriers of developments in ITS and continues to increase in the Netherlands and Europe.

In the Netherlands a shift can be seen from roadside systems towards more and more in-car services and services for end users. This has been facilitated by end-user connectivity. In the Netherlands connectivity is increasing at a rapid pace. The quarterly Dutch Smartphone User study conducted by telecom experts for Q1 2016 revealed that the number of end users of smartphones is still increasing in the Netherlands, with 86% of Dutch people owning a smartphone, up 5% from 81% in the first quarter of 2015.
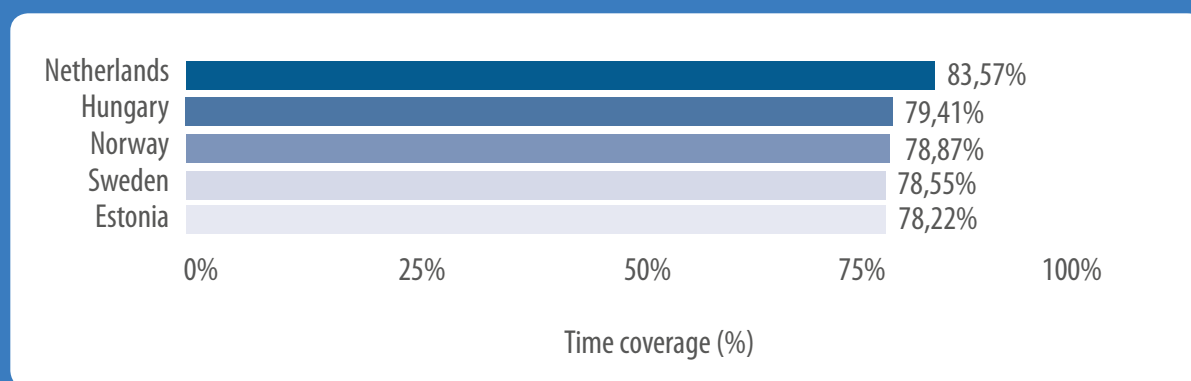
Figure 9: average time connected to 4G in 5 European countries
97% of Dutch people have internet access at home, a figure well above the EU average (85% for the 28 EU countries) - Source: Eurostat, 2016. There is a high level of 4G availability in the Netherlands (84% coverage), compared with other countries - Source: OpenSignal, The State of LTE, 2016.

According to the Telecommonitor 2016 presented by Autoriteit Consument & Markt (ACM) Consumers continue to use their mobile phone to call and to surf. The amount of mobile data used continues to increase. A total of 185 billion MB was consumed throughout 2016, an increase of 63% over 2015 and an increase of more than 500% over 2013. The number of text messages continues to decrease.

More trends on the area of connectivity in the past four years are:
- Strong increase of connections for internet or things
- Consumers buy more high speed internet
- In particular, mobile providers with no own network are growing strongly

On the mobile market, the number of connections for devices that communicate over the internet is increasing significantly. The number of SIM cards for devices such as garbage bins, alarm systems and smoke detectors communicating over the internet has risen from over 1.2 million in late 2013 to almost 4 million at the end of 2016.

Fast internet has become increasingly common for consumers. In 2016, one in three consumer connections was a super fast connection of more than 100 Mbps. By the end of 2013, this percentage was only 9%. The number of slow connections of less than 10 Mbps decreased in 2016 to 2% of all connections. In 2013, another 31% of the connections were running at less than 10 Mbps.

MOBILE
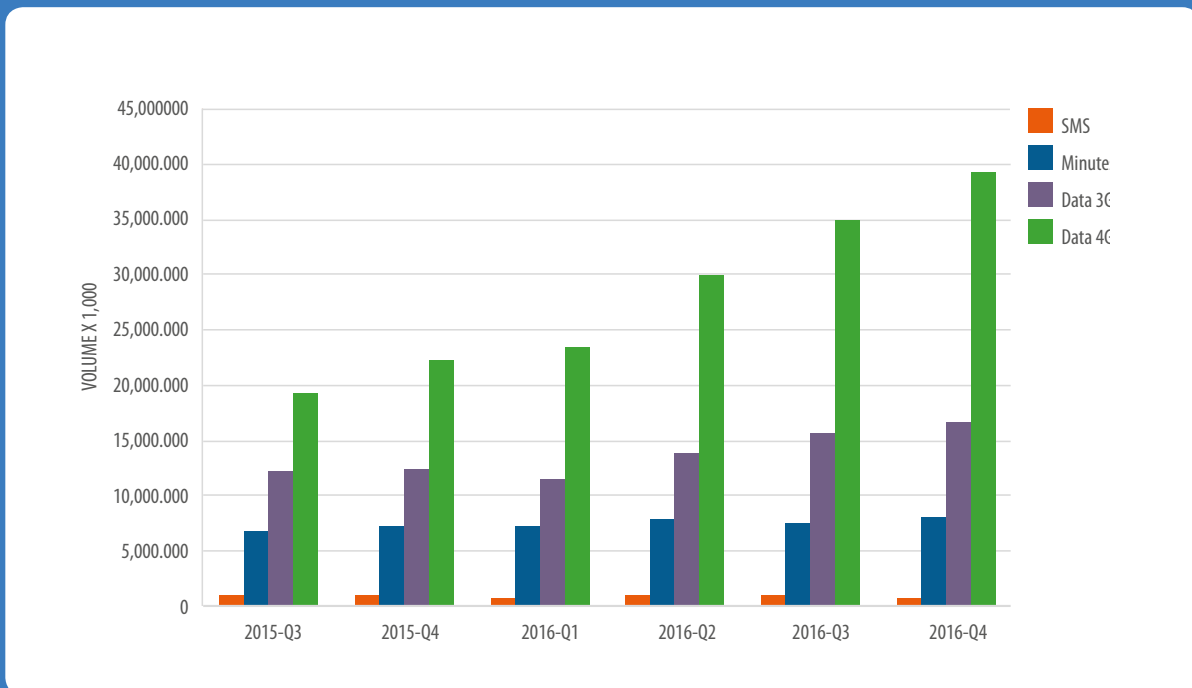
Figure 10: retail sales phone-calls, SMS and mobile internet - Source: ACM, Telecommonitor Q4, 2016

ROAMING DATA IN THE EU

Roam Like at Home rules entered into force on 15 June 2017. People pay domestic prices, irrespective of where they are travelling in the EU for phone-calls, SMS and mobile internet. The EU started reducing roaming charges since 2006 which has resulted in the end of roaming charges in 2017. This development makes connectivity across Europe more accessible and stimulates real-time communication for ITS services, for example.

5G DEVELOPMENTS

5G is mobile internet that is 100 times as fast as its predecessor, the current 4G network. The technology will only be commercially available to consumers from 2020, it is already available on a small scale in the North of the Netherlands for testing en developing towards a standardized network.

There are tests of applications in the areas of healthcare, energy, traffic & logistics, agriculture and the environment. For example, measuring diseases in crops on the fields. Sensors measure the data and thanks to the fast 5G, this, usually large amount of data, can be forwarded quickly for analysis. The 5G network is also tested in self-driving vehicles who are driving around test areas in the Eemshaven and in Loppersum.

Annex 1: Abbreviations

BABW	Administrative Provisions (Road Traffic) Decree (Besluit administratieve bepalingen inzake het wegverkeer)
BAS	Policy Consideration System (Beleids Afwegings Systematiek)
BB	Optimising Use Programme (Beter Benutten Programma)
BZK	Ministry of the Interior and Kingdom Relations (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties)
CAN	Controller Area Network
CBM	Cross-Border Management
CEDR	Conference of European Directors of Roads
CEF	Connecting Europe Facility
CMR	Convention Relative au Contrat de Transport International de Marchandises par Route
DGB	Directorate-General for Mobility and Transport (Directoraat Generaal Bereikbaarheid)
DITCM	Dutch Integrated Test Site for Cooperative Mobility
DRIP	Dynamic Route Information Panel (see VMS)
DTM	Dynamic Traffic Management
EC	European Commission
EIP	European ITS Platform
EL&I	Ministry of Economic Affairs, Agriculture and Innovation (Ministerie van Economische Zaken, Landbouw en Innovatie)
ELSA	European Large Scale Actions
EU	European Union
FEHRL	National Road Research Centres in Partnership
GNV	Large-scale Network-wide Traffic Management (Grootschalig Netwerkbreed Verkeersmanagement)
GOVI	Borderless Public Transport (Grenzeloos Openbaar Vervoer)
GPS	Global Positioning System
HTSM	High Tech Systems and Materials
ICT	See IT
IDVV	Inland Waterways Dynamic Traffic Management Stimulus (Impuls Dynamisch Verkeersmanagement Vaarwegen)
IenM	Ministry of Infrastructure and the Environment (Ministerie van Infrastructuur en Milieu)
IM	Incident Management
IT	Intelligent Technology
ITS	Intelligent Transport Systems
KiM	Netherlands Institute for Transport Policy Analysis
KLPD	Dutch National Police (Koninklijke Landelijke Politiedienst)
MOGIN	Mobility and Geo Information Netherlands (Mobiliteits- en Geo Informatie Nederland)
ND-OV	National Data Warehouse for Public Transport (Nationale Databank OV-gegevens)
NDPV	National Data Warehouse for Parking (Nationale Databank Parkeervoorzieningen)
NDW	National Traffic Data Warehouse (Nationale Databank Wegverkeergegevens)
NL	The Netherlands
NLIP	Neutral Logistics Information Platform (Neutraal Logistiek Informatie Platform)
NWB	National Roads Database (Nationaal Wegenbestand)
PSI	Public Sector Information Directive
RDS	Radio Data System (for RDS-TMC, see also TMC)
RDW	National Vehicle and Driving Licence Registration Authority (Dienst Wegverkeer)
RWS	Directorate-General for Public Works and Water Management (Rijkswaterstaat)
SOCRATES	System Of Coordinated Roadside and Automotive services for Traffic Efficiency en Safety
SPL	Strategic Logistics Platform (Strategisch Platform Logistiek)
SWSR	Intelligent Working, Intelligent Travelling (Slim Werken, Slim Reizen)
TMC	Traffic Message Channel
UWKS	Universal Roadside System (Universeel Wegkantsysteem)
VI	Traffic Information (Verkeersinformatie)
VM	Traffic Management (Verkeersmanagement)
VMS	Variable Message Sign
VRI	Traffic control system (Verkeersregelinstallatie)
WiM	Weigh in Motion
Wob	Government Information (Public Access) Act (Wet openbaarheid van bestuur)

PROJECTS

PROJECTS	HUMAN MACHINE INTERFACE	LIABILITY	ARCHITECTURE, STANDARDISATION	BUSINESS CASES	EFFECTS ON TRAFFIC FLOW	EFFECTS ON COSTS	EFFECTS ON THE ENVIRONMENT	EFFECTS ON JOURNEY TIME	EFFECTS ON TRAFFIC SAFETY	USER BEHAVIOUR / USER SATISFACTION	GOVERNANCE	PRIVACY	METHOD OF PROCUREMENT	RELIABILITY OF DATA AND SYSTEMS	SECURITY OF DATA AND SYSTEMS	TECHNOLOGY	TRAFFIC BEHAVIOUR (HUMAN FACTORS)	TRAFFIC MANAGEMENT, TRAFFIC CENTRES
COOPERATIVE VEHICLE INFRASTRUCTURE SYSTEMS CVIS)			X		X					X						X		X
PLATOONING TRUCKS TNO	X				X					X	X			X		X	X	
ECOMOVE			X				X			X						X	X	
UDRIVE	X						X		X								X	
FREILOT					X		X	X	X									
INWEVA & WBU			X		X		X							X				X
DIGITAL ROAD AUTHORITY - AIR QUALITY JAN VAN GALENSTRAAT			X		X		X									X		X
WEPODS										X				X		X		
COOPERATIVE ITS CORRIDOR			X							X	X		X	X	X	X		
OPSCHALING PARCKR				X						X						X		
SPEED SLOT	X									X	X			X	X	X	X	
PPA NORTH (PHASE 2)			X	X	X	X		X		X	X		X	X		X	X	X
HEERO 1 HARMONIZED ECALL EUROPEAN PILOT			X							X				X	X			
MULTI MODALE REIS INFORMATIE			X		X			X		X				X				
DYNAMAX - DYNAMIC MAXIMUM SPEEDS	X		X		X	X	X	X	X	X						X		X
ACCESSIBILITY SCHEVENINGEN				X	X		X			X	X				X	X	X	X
CHARM PCP (COOPERATIVE)			X								X			X	X	X		X
VEHICLE ASSISTANCE ON THE TRAFFIC LANE			X		X	X			X	X							X	X
BRABANT IN-CAR III	X		X		X			X		X			X			X	X	
SMART TRAFFIC			X		X			X						X		X		X
PPA ROADSIDE (PHASE 1)			X		X	X		X		X	X		X	X		X	X	X
TRAFFIC PREDICTION FIELD TEST					X			X	X				X	X		X	X	X
WIFI CYCLE MEASUREMENT LEEUWARDEN					X			X	X							X	X	
COMPASS4D	X	X	X	X		X	X		X	X					X	X	X	
SHOCKWAVE TRAFFIC JAMS A58	X		X		X			X	X	X	X	X	X	X	X	X	X	
DATA TOP 5			X											X				
SAFESPOT			X						X							X		X
INFORMATION SERVICES	X				X					X								
ECODRIVER	X			X		X	X			X						X		
UNMANNED HELICOPTER: STUDY OF TRAFFIC FLOW					X			X	X							X	X	
NDW DATAFUSION			X		X			X					X	X	X	X		X
SECURE LANE				X					X					X	X	X		
SENSOR CITY			X													X		
HUMAN INTERACTION WITH AUTOMATION IAVTRM (DAVI)	X				X				X	X						X	X	
THE DIGITAL ROAD AUTHORITY - INCIDENT MANAGEMENT			X		X			X						X	X	X		X
DRIVE C2X			X		X		X		X	X						X		X

PROJECTS

PROJECTS	HUMAN MACHINE INTERFACE	LIABILITY	ARCHITECTURE, STANDARDISATION	BUSINESS CASES	EFFECTS ON TRAFFIC FLOW	EFFECTS ON COSTS	EFFECTS ON THE ENVIRONMENT	EFFECTS ON JOURNEY TIME	EFFECTS ON TRAFFIC SAFETY	USER BEHAVIOUR / USER SATISFACTION	GOVERNANCE	PRIVACY	METHOD OF PROCUREMENT	RELIABILITY OF DATA AND SYSTEMS	SECURITY OF DATA AND SYSTEMS	TECHNOLOGY	TRAFFIC BEHAVIOUR (HUMAN FACTORS)	TRAFFIC MANAGEMENT, TRAFFIC CENTRES
BBV-ITS DATA			X											X				
BBV-ITS INCIDENTS			X		X	X			X	X				X				
BIKESCOUT						X			X	X			X	X		X	X	
PPA WEST (PHASE 2)			X	X	X	X			X			X	X	X		X	X	X
SHOCKWAVES A13			X		X				X							X	X	X
APPLICATION OF INFORMATION SERVICES IN SAA																X	X	X
BLUE WAVE CONNECTED			X		X	X	X			X						X		X
OPEN PARKING DATA			X											X				
BBV ITS - TALKING TRAFFIC			X		X	X	X	X	X					X		X	X	X
BBV-ITS TRAVEL INFORMATION SERVICES	X			X	X	X		X		X						X	X	
BBV-ITS EVENTS			X	X	X	X		X									X	X
BBV-ITS IMMA		X	X			X					X	X						
BBV-ITS SUPERMARKET LOGISTICS				X	X	X	X									X		
SURVEY GEODATA-INFRASTRUCTURE FOR AUTONOMOUS CAR		X	X								X	X		X	X	X		
PPA IN-CAR (PHASE 1)									X	X	X					X		
THE DIGITAL ROAD AUTHORITY - TRAFFIC FLOW IN IJBURG			X		X				X	X				X		X		X
BRABANT IN-CAR II	X				X		X			X			X			X	X	
HF AUTO	X				X				X	X							X	
DUTCH AUTOMATED VEHICLE INITIATIVE (DAVI)	X	X	X		X				X	X		X		X	X	X	X	X
ALCOHOL LOCK		X							X	X						X	X	
ANTI ACCIDENT SYSTEMS LARGE-SCALE FIELD TEST					X				X	X							X	
PPA SOUTH-EAST (PHASE 2)	X	X	X	X	X	X			X		X	X	X	X		X	X	X
CONNECTING MOBILITY DATATHON									X							X	X	

SEE ITSOVERZICHT.CONNECTINGMOBILITY.NL

SERVICES	SIGNAGE	PARKING INFO	TRAFFC LIGHTS	LOGISTICS	NAVIGATION	TRAVEL PLANNER	LANE ADVICE	SAFETY ADVICE	SAFETY WARNINGS
MAXS								X	
SMOOVER					X	X	X	X	X
SLOT MANAGEMENT				X					
PARCKR		X							
TIMES UPP						X			
IJBURG STREETWISE APP					X				
ADAM					X	X			
PARKING SERVICE SENSOR CITY		X			X				
TRAVEL ALARM APP SERVICE					X	X			
DRIVING STYLE MONITOR SERVICE								X	
ROAD HAZARD WARNING COMPASS4D								X	X
ROUTE 66 NAVIGATION					X	X			
ROUTERADAR					X	X			
SPEEDLOCK								X	X
ACCESSIBILITY SCHEVENINGEN		X				X			
CAMERA TRACKING SYSTEM				X					
TOMTOM TRAFFIC					X	X			
HERE MAPS					X	X			
FLOWPATROL								X	X
SMART ROUTING SERVICE SENSOR CITY					X				
RED LIGHT VIOLATION WARNING COMPASS4D			X					X	X
BLIKR	X				X	X	X	X	X
DYNAMIC SPEED ADVICE								X	
MULTIMODAL TRAVEL ADVICE SENSOR CITY					X	X			
INCIDENT MANAGEMENT DIGITAL ROAD OPERATOR			X						
IN-CAR FUEL AND ENERGY-SAVING								X	
FILEJEPPEN					X	X			
GOABOUT					X	X			
CONTROLLED TRAFFIC SUPPORT TECHNOLOGY								X	
MOBILE NINJA					X	X			
ROAD WORKS WARNING C-ITS CORRIDOR								X	X
IKBESPAAR								X	
DYNAMAX - DYNAMIC SPEED LIMITS								X	
VID-APP					X	X			
BESTDRIVER-APP								X	
ANDES ROUTEPLANNER					X	X			
ZOOF					X	X	X	X	X
SUPERROUTE					X	X			
PRIVATE TRAFFIC MANAGEMENT AROUND MAJOR EVENTS	X	X	X						
WAZE					X	X			
FLITSMEISTER					X	X			

ITS

RESEARCH	EXCHANGE OF KNOWLEDGE	INFLUENCING (INTERNATIONAL) DIRECTION	INFLUENCING EU LEGISLATION

EC ITS COMMITTEE (S)

EC ITS COMMITTEE EXPERT GROUPS (S/T)

EC (DG MOVE, DG GROWTH, DG RTD, DG CONNECT, DG CLIMA (S))

UNECE (S&T)

CEDR (T)

EU EIP (T)

ITS CORRIDORS (T&O)

CEN/TC 278 AND ISO/TC 204 (T&O)

ETSI/TC ITS (T&O)

ERTRAC (T)

FRAME FORUM

TISA (T)

ERTICO

POLIS

ECTRI

EARPA

TRA (CONFERENCE)

IRF

FACHAUSSCHUSS 3.1

FEHRL

INTERNATIONAL TRANSPORT FORUM (OECD)

EUROPEAN COMMISSION (HORIZON 2020/CEF/INTERREG)

INTERNATIONAL

SMART MOBILITY BOARD (MIN. I&E/RWS)

TNO | TUs | NDW

SMITS STEERING GROUP | 5 NOVEMBER GROUP

RDW | DGB | RWS

NEN

RVO

RWS ITS TEAM

C-ITS

RESEARCH	EXCHANGE OF KNOWLEDGE	INFLUENCING (INTERNATIONAL) DIRECTION	INFLUENCING EU LEGISLATION

DECLARATION OF A'DAM, HIGH LEVEL STRUCTURAL DIALOGUE (S)

STRIA (DG RTD)

WORK GROUPS

EC ITS COMMITTEE (S)

EU C-ITS DEPLOYEMENT PLATFORM (S&T)

EC ITS COMMITTEE EXPERT GROUPS (S/T)

EC (DG MOVE, DG GROWTH, DG RTD, DG CONNECT, DG CLIMA (S))

AMSTERDAM GROUP (O&T)

OETTINGER ROUND TABLES (S)

EUROPE-US-JAPAN CONSULTATIONS (STANDARDISATION)

CEDR(T)

ACEA

ART. 29 WP DATA PROTECTION

CAR2CAR

C-ITS CORRIDOR/INTERCOR/C-ROADS (T)

CEN/TC 278 and ISO/TC 204 (T&O)

EU EIP (T)

TRUCK PLATOONING (T)

ETSI/TC ITS (T)

ERTRAC (T)

CLEPA

ERTICO

FIA

EUROPEAN COMMISSION (HORIZON 2020/CEF/INTERREG)

POLIS

IRF

FACHAUSSCHUSS 3.1

TRA (CONFERENCE)

CODECS (O&T)

EARPA

EPoSS

BENELUX (S&T)

INTERNATIONAL TRANSPORT FORUM (OECD)

IEEE

INTERNATIONAL

RVO

RWS ITS TEAM

SMITS STEERING GROUP

SMART MOBILITY BOARD (MIN. I&E/RWS)

NEN

TNO | TUs

NATIONAL TELECOMS AGENCY

RDW | DGB | RWS

DUTCH DATA PROTECTION AUTHORITY

ANWB | IVERA

TACTICAL C-ITS BOARD

CS&P: STANDARDISATION/ ARCHITECTURE

CONNEKT

LRT: LEGAL | LRT: SECURITY