Ministerie van Infrastructuur
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Directive 2010/40/EU
Progress Report 2017-2020
The Netherlands

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Introduction

This progress 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 specific moments. This report is a follow-up on the progress report previously submitted to the European Commission (EC) in 2017 (National Progress Report 2014-2017 of the Netherlands). We use the opportunity presented by the EC to combine the national progress report with the due progress reports 2020 on ITS delegated acts A, B, C, D and E.

In this report we, the Ministry of Infrastructure and Water Management, give an overview of progress made on the deployment of Intelligent Transport Systems (ITS) in the Netherlands, including Key Performance Indicators (KPIs). Also, we describe in this report the progress made regarding the implementation of the ITS Delegated Acts and give an overview of ITS in the Netherlands at large.
To provide good insight into the progress made in the area of ITS in the Netherlands, we mainly focused on the projects, services and activities that have been started, undertaken, or completed in the 2017-2020 period. It is worth mentioning that the activities and projects mentioned in this report are not exhaustive, but are chosen as the most relevant ones with regards to the European context. 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 focused on presenting facts, figures and images. This report is a result of a thorough desk study, in combination with thirteen interviews with policy makers from the Ministry of Infrastructure and Water Management (the ministry) and senior advisors of the Directorate-General for Public Works and Water Management ('Rijkswaterstaat') on ITS.

Structure

Chapter 1 describes the general overview of the national activities and, moreover, the general progress since 2017.

Chapter 2 describes the progress made in implementing the European ITS actions in the Netherlands. These actions are contributing to the compatibility, interoperability and continuity of ITS solutions across the European Union and are also complementary to the Dutch ITS strategy.

Chapter 3 describes the activities, projects and initiatives on the four priority areas determined at the European level. The four priority areas are:
- Priority area 1: Optimal use of road, traffic and travel data;
- Priority area 2: Continuity of traffic and freight management ITS services;
- Priority area 3: ITS road safety and security applications;
- Priority area 4: Linking the vehicle with the transport infrastructure.

Chapter 4 describes the impact of our projects, activities and initiatives on the KPIs that are determined.

Chapter 5 contains some closing remarks.

Finally, appendix 1 contains a list of abbreviations and in appendix 2 an overview of all the relevant activities between 2017-2020 can be found.


16:21
DELIVERY ON TIME
OPEN
LOADING NEW ROUTE
BLUE WAVE
CLOSING IN 3 MIN
OPEN
+ 3 MIN

1 Progress Regarding Policy and National Activities

1.1 General Progress Since 2017 on National Policy

The general progress made in the Netherlands described in this chapter is clustered along three areas:

1. *From experimenting to implementing*

The progress that is made is a direct result of the shift in focus we made from testing new ITS services towards implementing them, where a crucial aspect is the scale-up potential of the service. As a result, newer forms of ITS (such as C-ITS) are becoming more and more a part of the mobility system and, therefore, recognizable for the end-users. One of the challenges that arises from this, is that the implementation of ITS services requires an organizational implementation for the governmental bodies involved. New internal processes become necessary, and possibly even new competencies and knowledge is required for some.

2. *Strong cooperation with private and public parties*

In the Netherlands, we choose to face ITS-related challenges in a cooperative way. Public bodies cooperate with each other (see paragraph 1.2 among others), and public parties cooperate with private parties. Public-private partnerships have been fruitful in order to achieve mutual goals. The past years, both the public and the private side realised that working together is the only option towards the mutual goal of implementing ITS services responsibly and efficiently. Private and public parties have got to know each other well over the past years. One of the topics they cooperate in, is data (see Partnership Talking Traffic in paragraph 3.2.2). The automatization of data exchange between public and private parties has grown substantially the past years, thanks to the efforts the Netherlands have put into this.

3. *Data as a tool to fulfil policy goals*

The European Data Protection Board communicates guidelines of which we assess the implications thoroughly. Of course, the implementation of the General Data Protection Regulation (GDPR) has affected the activities related to data as, amongst other things, it regulates data protection and privacy. As a result, organisations that work with data have the duty to do this responsibly. We perceive the implementation of GDPR as valuable, as it has improved the regulation of all data-related activities within the Netherlands. Currently, Dutch governmental bodies active in ITS see data as a base-product necessary to achieve their goals – working with data has become one of their primary processes. This is, amongst other things, a result of the program Optimizing Use (‘*Beter Benutten*’) – mentioned in the progress report 2014 – 2017. In this program, data and public-private partnerships played a central role. Moreover, public parties realise that not only their own data is needed. Data from private parties is also essential and increases the chance of achieving public goals. Public parties have been cooperating with the private side on floating-car data for example, which is now widely spread in the Dutch operations (for instance, NDW Floating Car Data, appendix 2). Data-related market contracts are nowadays organized nationally – rather than locally –, which is more efficient.

The new mindset resulted in an increase of automatization of data-exchange between the road users and between road users and the infrastructure. The Netherlands is aiming to increase the amount and the quality of data – also from private sources (see Bundling Forces (‘*Krachtenbundeling*’), paragraph 1.2). One of the next steps is to increase the use of probevehicle data, of which the first datasets of private parties were received by the Data Task Force (see paragraph 1.3) since summer 2019. Another point of focus is to increase the level of multimodal data, which can contribute to the development of Mobility as a Service (MaaS).

We look broader than only congestion-related goals. Safety has always been top priority together with solving congestion, but we also look at goals such as sustainability and societal impact. This is also the case when performing ITS activities. In addition, ITS activities used to be mainly aimed on the highway network. However, one of the more challenging areas in the Dutch mobility system is the urban area. Therefore, in the yearly local high level meeting covering the themes Infrastructure, Space and Transport (‘*Bestuurlijk Overleg Meerjarenprogramma Infrastructuur, Ruimte en Transport*’), it has been decided in 2018 that The Netherlands will implement ITS initiatives in urban and interurban areas.

COVID-19

Unfortunately, this progress report cannot proceed without mentioning the situation regarding COVID-19. It is

impossible to define exactly what the impact of COVID-19 is and/or has been on the different ITS activities and projects in the Netherlands. However, several initiatives have been affected by it in 2020. For example, several pilots or tests are postponed, the sudden change in the mobility system affects project results, and some large events have been cancelled or postponed.
Additionally, questions arise regarding the impact of COVID-19 on future travel behaviour of the end-user. It may be possible that the travel behaviour changes as a result of the pandemic (e.g. on the shortterm we now see an increased use of the car and a decrease use of the train). How this evolves, remains uncertain for now.

1.2 General Overview of the National Activities

Letter to the House of Representatives
'Smart mobility, Dutch reality' is what our minister wrote in a formal letter to the House of Representatives ('*Tweede Kamer*')[1]. It was the title of the letter and portrays the ambition we are fulfilling currently. In October 2018 the letter was sent and it describes our current approach with regards to smart mobility and ITS. The main message was that the Netherlands is changing their focus from experimenting or piloting towards implementing ITS. The Netherlands have learned a lot thanks to their 'learning by doing' approach in the past, and now it is time to use that knowledge in the mobility system. This also requires change in governmental institutions. The goal set in the ministerial letter, is that we strive for a safe, smart and sustainable traffic and transport system where the different parts seamlessly match. The letter of the minister is still an anchor point today and the decisions made by public parties should meet the ambition and activities stated in the letter. There are four pillars mentioned in the letter, aimed at results on both short and longterm goals. For each pillar, there are several actions defined in order to achieve the set goals. The four pillars are:

1. *Encouraging the use of existing products and services*
We see that there are currently many different products and services available. The safe use of these products and services can generate opportunities on the short term with regards to traffic safety, accessibility, and sustainability. Various initiatives are being taken to stimulate their actual application or use, both towards industry and towards end-users, e.g. the convenant 'Safe Use of Smart Functions'[2].

2. *Responsible introduction of new generation of vehicles*
Vehicles are becoming more autonomous and connected these days. In order to introduce this new generation of vehicles in a responsible manner, we find it essential to adjust national and international legislation. We collaborate with the industry and the EC to ensure that these new vehicles can be introduced safely.

3. *Future-ready infrastructure and road management*
The minister writes that smart mobility – and ITS in particular – has an impact on both the infrastructure and the behaviour of vehicles and end-users. Therefore, we will focus on data-exchange in order to facilitate the services provided by smart mobility solutions so that processes and technology will be improved and renewed.

4. *Careful use of data exchange and connectivity*
The aforementioned developments in the area of smart mobility all make use of some kind of communication and datatool. The Netherlands is actively supporting the discussions and activities at an international level. Mostly due to national-specific conditions, the Netherlands focuses on more use and effect of personalised traffic services and driving supportive services with the available telecom-networks for our own investments – whilst still safeguarding a level playing field (hybrid approach) on a policy level.

This focused approach, alongside the four pillars, stimulates investments both at the public and private side, in order to increase the impact and the efficiency of the efforts made. All in order to make the step from experimenting and testing to use in the daily practice.

1 https://www.government.nl/binaries/government/documents/parliamentary-documents/2018/10/04/smart-mobility-dutch-reality/Smart+mobility+Dutch+reality++-+def.pdf
2 https://verkeersveiligheidscoalitie.nl/convenant/#:~:text=Het%20initiatief%20voor%20het%20convenant,'Afleiding%20in%20het%20verkeer'.

Bundling Forces

Following the ministerial letter, a formal cooperation between many different governmental bodies has been created in order to increase the scale and impact of smart mobility activities. National, regional and local authorities joined forces to ensure top-level preconditions for the digitalization of mobility. The cooperation is called Bundling Forces (‘*Krachtenbundeling*’)[3]. As of October 2018, all levels of the Dutch government are collaborating along four principles to ensure scale and harmonisation of policies, workflow and standards. These principles are translated into shared goals, agreements and collaborations on all major smart mobility themes (‘*Krachtenbundels*’). The goal is to make it easy and appealing for national and international enterprises to introduce – in a responsible manner – mobility services that enhance the travel experience and contribute to solving the challenges that are being faced: reducing the number of road casualties, sustainability, and keeping the country liveable, accessible and affordable for everyone. The governmental bodies are joining forces by directing their e¬fforts towards the market and the traveller as a single government, ensuring scalable solutions. The bodies in the cooperation are learning and tackling the challenges together, using their combined competences, networks and capacity. The fact that the Dutch government decided that ITS becomes an integral part of the yearly High Level Meeting (explained in paragraph 1.1) is one of the quick-wins made in this trajectory. This is a sign that ITS has become a more mature topic and instrument on the strategic agenda of governments in the Netherlands. The four action lines in the Bundling Forces approach are:

1. *Digitally in order and the traveller digitally protected;*

An essential element in the process of introducing new mobility services, is the role of digitalization and data. An important part of the mobility-data comes from the public sector, which is why it is important that governmental bodies cooperate in this area. This way, the data quality and quantity that is effectively used increases. In the cooperation of Bundling Forces, the governmental bodies set goals regarding: having 90% of the public data in order by 2023, ensuring that data privacy and security are in order, using new data sources, increasing the use and implementation of the new generation intelligent traffic lights, and using the same so-called iServices (intelligent services, ‘iDiensten’) in the internal organisations. In addition, the governmental bodies are determined to come to an efficient organisation and design of the public data landscape.

2. *Increased use of existing smart services;*

The governmental bodies do not only bundle forces together, but also look for partnerships with private parties. This is particularly shown in the second action line. This action line defines the following goals: to increase the use of driver assistance systems by 20% in 2022, to work in a nationally coordinated workflow to increase the use of smart services in situations of road works (resulting in less nuisance for the user, as a result of road work for example), and to increase of logistical services on Connected Transport Corridors.

3. *Responsible introduction of the new generation vehicles and MaaS;*

To ensure a responsible and large-scale introduction of MaaS and automated vehicles, the bundled forces will investigate the impact on the mobility system and infrastructure, and harmonize regional policies, workflow, and technical standards. To do so, parties agree upon to work together in the field of policymaking, concession-providing, (data-)access, taxation, special development. Moreover, the bundled forces agree upon becoming ready for the responsible introduction of connected and automated vehicles: by 2023 it is an integral part of public transport concessions and a large effort is put into knowledge development. Parties also agree upon developing knowledge, standards, projects, legislations on national and international level regarding communication technologies as a basis for smart and safe mobility. Lastly, the parties decide upon a research and investment strategy regarding the physical infrastructure.

4. *Joint human capital agenda.*

A true bundling of forces also requires cooperation and exchange of human capital. Cooperation regarding capacity, training of employees and future professionals are the key areas of this action line.

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3 https://ipo.nl/files/8815/6161/8952/Smart_Mobility_Dutch_Reality_Gezamenlijke_ambities_en_samenwerkingsprincipes_3_juni_2019.pdf

The governmental bodies will work together on the aforementioned goals in order to ensure a responsible introduction of smart mobility initiatives[4].

Dutch Safety Board

When accidents or disasters happen, the Dutch Safety Board investigates how it was possible that they occurred, with the aim of learning lessons for the future and, ultimately, improving safety in the Netherlands[5]. In 2019 the Dutch Safety Board (*'Onderzoeksraad voor de Veiligheid'*) published a report on the impact of Advanced Driver Assistance Systems (ADAS) on traffic safety. The report *'Who is in control? Road safety and automation in road traffic'*[6] states that: *"drivers in vehicles fitted with ADAS play a different role than drivers in conventional cars, namely the role of operator. The range of tasks that this role engenders creates the risk that drivers become less alert and react too slowly... At the same time, in legal terms, the driver remains responsible and liable, even if the vehicle intervenes and/or if the driver is driving under the assumption that the vehicle is in fact driving itself."*
Chapter 5 describes how the ministry dealt with the results of the report.

1.3 High Level Activities at European Level

High Level Meetings, Declaration of Amsterdam

As stated before, an essential element in the Dutch approach is cooperation. Cooperation is not only visible within the Netherlands' geographical boundaries, but also at the European level which, apart from more efficient use of knowledge and resources, is a necessity for many of the new ITS services. As a result of Dutch initiatives, the Declaration of Amsterdam on cooperation in the field of connected and automated driving was signed and the first High Level Meeting was held in Amsterdam in 2017. Representatives from the European Commission, 24 Member States, the business community, public bodies, the automotive and telecom industries were all present and contributed. The Netherlands was chair of this first High Level Meeting. The open and informal discussion made it possible to identify concrete steps to enable further progress in the introduction of connected and automated driving on European roads.

Data Task Force

One of the priorities that followed after the High Level Meeting was initiating the Data Task Force. This private-public taskforce aims to improve the data-exchange in the mobility sector. The Data Task Force chooses to focus first on data with regards to traffic safety, thereby giving substance to Delegated Act 886/2013 (Action C) defined by the EC (see paragraph 2.3). The Netherlands is chair of the Data Task Force. Thanks to the efforts of the Data Task Force, a Memorandum of Understanding (MoU) has been signed between public authorities of member states (e.g. ministries), original equipment manufacturers (OEMs) and service providers[7]. The MoU describes a shared understanding of the legislation on the subject of data-exchange and the activities the Data Task Force will carry out. The MoU was signed the 3rd of June 2019, at the yearly ITS European Congress that was held in the Netherlands (Brainport Eindhoven and Helmond Automotive Campus).

The ITS European Congress lasted three days. Attendees were invited to share experiences, innovations and achievements, discuss important ITS topics and broaden their network. The congress confirmed the notion that the Netherlands is highly active in the ITS-sector and many technologies are being developed.

4 The latest state of affairs on the cooperation and smart mobility can be found via Dutch Mobility Innovations: https://dutchmobilityinnovations.com/landing-nl.
5 The Safety Board is independent and is free to decide which incidents to investigate. In particular, it focuses on situations in which people's personal safety is dependent on third parties, such as the government or companies. Its investigations do not address issues of blame or liability.
6 https://www.onderzoeksraad.nl/en/page/4729/who-is-in-control-road-safety-and-automation-in-road-traffic.
7 https://www.dataforroadsafety.eu/images/Documenten/MoU%20Data%20for%20Road%20Safety.pdf

Co-Chair CEDR Connected and Automated Driving group

The Netherlands is the co-chair of Connected and Automated Driving group of the Conference of European Directors of Roads of the European Union (CEDR) and has been active for three years now. CEDR is a partnership between road administrators and has several research programs, that are funded by the road administrators themselves. Most of the researchers want to provide insights on the effect of future developments on the responsibilities of road operators today.

High level activities related to standardisation

We find standardisation at the EU-level very important. Hence, we put a lot of effort into this in order to improve the level of standardisation in the EU. In several workgroups we are in a leading position, which shows how crucial we find it. Firstly, the Netherlands is chair of the CEN commission TC/278. CEN/TC 278 is responsible for managing the preparation of standards in the field of ITS in Europe. In specific, the scope entails standardization in the field of telematics to be applied to road traffic and transport, including those elements that need technical harmonization for intermodal operation in the case of other means of transport. It serves as a platform for European stakeholders to exchange knowledge, information, best practices and experiences in ITS. CEN TC/278 also has liaisons with ISO/TC 204 Intelligent Transport Systems and ETSI TC ITS. Secondly, we are chair of the DATEX-II Steering Group and the two-day DATEX-II Forum was held in Utrecht, the Netherlands, in 2018[8].

8 https://www.datex2.eu/sites/default/files/2018-07/Report%20DATEX%20II%20Forum%202018.pdf

2 Progress of ITS Actions in the Netherlands

The Netherlands sees the importance of proper information and services for the purposes covered by the Delegated Acts and has been a frontrunner in traffic management, traffic information and the provision of data for service providers. As a result, the Netherlands have fulfilled all the Delegated Acts. In 2018, we have reported to the EC regarding Delegated Act 2015/962 and in 2019 regarding Delegated Act 886/2013 and Delegated Act 885/2013.

2.1 The Functioning of the National Access Point ITS

In the Netherlands, collected data are entered into a national database of the National Data Warehouse for Traffic Information (NDW). The source data for public transport travel information is received by the Collaboration of Decentralized Public Transport Authorities ('DOVA'). Traffic-related data sources are made accessible via the National Access Point ITS[9] (NAP). The NAP is functioning as a register of ITS data (public and private) that is publicly available.

The registration of data sources has seen no significant changes in the past years; the data sources provide their metadata and a provision to search those metadata is in place. Datasets are ordered by the following subjects: truck parking, safety information, road and traffic safety and multimodal travel data.

The following parties are involved in the operation of the NAP:

- *National Data Warehouse for Traffic Information (NDW)*: The NDW, established over a decade ago, is an organization that collects, stores and distributes traffic data. It manages the NAP. The NDW is an alliance in which 19 public authorities (central government, provinces, urban regions and municipalities) work together[10];
- *Collaboration of Decentralized Public Transport Authorities ('DOVA')*: For standardization of multimodal travel information services, Dutch stakeholders are cooperating in a public-private platform, hosted by 'DOVA', which additionally is adapting data sources to prescribed standards[11]. The DOVA partnership consists of all the 12 provinces in the Netherlands, the Amsterdam Transport Region, the Rotterdam The Hague Metropolitan Area and the OV Bureau Groningen-Drenthe. The organization consists of two clusters: public transport network and public transport data;
- *Ministry of Infrastructure and Water Management:* The ministry has been appointed as the national assessment body for the Delegated Acts A and B;
- *National Vehicle and Driving Licence Registration ('Dienst Wegverkeer', RDW)*: The RDW has been appointed as the national assessment body for the Delegated Acts C and E. RDW is the Dutch vehicle authority in the mobility chain. RDW has developed extensive expertise through its years of experience in executing its tasks in the area of licensing vehicles and vehicle parts, supervision and enforcement, registration, information provision and issuing documents.

The Dutch NAP has already been developed to an advanced stage. Therefore, the NDW has been active in ensuring the NAP becomes more known by relevant stakeholders and will continue to do so in the future.

2.2 Reporting Obligation under Delegated Regulation (EU) 2017/1926 on the Provision of EU-wide Multimodal Travel Information Services (priority action a)

In December 2019, the NAP was extended to include multimodal information as well. A national profile for Network Timetable Exchange (NeTEx) has been developed. For road traffic, DATEX II is used. Further harmonization is an ongoing and necessary process, with an ever-growing number of (multimodal) data suppliers. For example, we will add more data regarding bicycles and we are working together with relevant parties in order to accomplish this, like DOVA. This contributes to the amount of available multimodal data at the NAP.

At the moment, private data is available at the NAP. However, most of this data has been acquired by the (central) government and afterwards registered at the NAP. The NDW plans to add more privately owned datasets. This is, however, a challenge since private parties are not obliged to register their data in the NAP, whereas public parties are. At the European level the Netherlands remains active in increasing harmonization and the data quality, e.g. as chair of the Data Task Force (see paragraph 1.3), chair of the DATEX organization and convenor of CEN TC/278.

9 https://nt.ndw.nu
10 https://nt.ndw.nu/#/home
11 https://www.dova.nu/

2.3 Reporting Obligation under Delegated Regulation (EU) 2015/962 on the Provision of EU-wide Real-time Traffic Information Services (priority action b)

For five years the data regarding Delegated Act 2015/962 has been operational in the NAP. All the Dutch motorways are included and, in some cases, real-time traffic information for other type of roads are given as well. For each dataset a description (metadata) is often available which includes: publication, application area, quality, data exchange and contact.

Data sources that have been published that cover real-time information are for example: road characteristics, road works, parking data and location of electric charging stations. It contains public data (NDW, Rijkswaterstaat) and private data (TomTom, Here Technologies). The basic situation has not changed substantially the last years, except for the fact that the content is being updated all the time and new sources are being added.

Improvements of the data are made by:
- Cooperation between public and private parties (e.g. Data Task Force)
- TN-ITS-GO project (part of the TN-ITS, see project list in appendix 2)
- Data fusion
- Data merging
- Use of the feedback loops
- Supervision of the terms of use of NAP by the NDW

As a result of the earlier work in the European ITS Platform (EU-EIP, see paragraph 3.3), a proposal of a harmonised set of metadata applicable for priority actions B, C and E has been developed. The result was a joint effort of Austria, Germany and the Netherlands, called the "*Coordinated Metadata Catalogue*", where a 'minimum set of metadata' was proposed[12]. Moreover, in the Partnership Talking Traffic (see paragraph 3.2.2) a great deal of effort has been put into objectifying data quality and improving it (both public data and private data). The accessibility of all Variable Message Sign (VMS) of Rijkswaterstaat has thus been arranged. Lastly, we have concluded several data purchase contracts (bicycle data, logistics data, traffic sign data) that contribute greatly to quality and availability.

In the further development of the NAPs, the ambition is to further harmonise the meta-data at European level.

2.4 Reporting Obligation under Delegated Regulation (EU) No 886/2013 on Data and Procedures for the Provision of Road Safety-related Minimum Universal Traffic Information Free of Charge to Users (priority action c)

European legislation and regulations (ITS Directive 2010/40/ EU, Action C) requires Rijkswaterstaat to relay safety-related messages to service providers. The information (data) that Rijkswaterstaat shares with service providers covers:
- Current traffic information, such as the nature, cause and residual duration of disruptions;
- Data resulting from the work processes of the measures mentioned, such as the status of traffic measures implemented (local speed limits, lane closures, diversions and green periods of traffic lights) and safety-related messages (detected slipperiness, ghost drivers, traffic tailbacks, obstacles on the road).

In turn, the service providers ensure that the information reaches the road-user via radio, web pages, navigation systems, apps and/or social media[13].

12 https://www.its-platform.eu/filedepot_download/1976/6295
13 https://bereiknu.nl/sites/bereiknu.nl/files/documenten/Uitvoeringsplan%20WVM_versie%2025%20mei%20tbv%20Bestuur.pdf

The Netherlands is the chair of the Data Task Force and has, based on the MoU, started a proof of concept: 'Data for road safety'. During this proof of concept, the partners test their common understanding of implementing the Delegated Act 886/2013 Action C. The discussions even led further than the Delegated Act, by setting up an agreement where not only the end-user is receiving the services for free, but a whole system is built around free-of-charge data exchange – on the basis of reciprocity. The aim is to increase the availability and the reach of safety-related traffic information and to commoditize it. See the text box for the further development of the NAP in the Netherlands.

Experiment: the NAP as Aggregator

In the thought of building a system based on reciprocity, the Netherlands is also experimenting with the NAP not only as a metadata reference, but additionally as an aggregator. The NDW functions as one of the central aggregation servers for this proof of concept (with the geographical scope of the Netherlands). For the service provision we differentiate between:

- **Services and data for road operators**
- **Services and data for road users:**
  - **Broadcasting**
  - **Narrowcasting**

For the services and data for road operators, NDW will use and distribute the data feed as an additional data stream for the processes of road operators. NDW will aggregate this information to provide a safety-related traffic information feed for the road operators and traffic management centres. The interpretation of data aggregated from multiple vehicles together with those from other available data sources (e.g. infrastructure data) must determine the meaning and relevance of the Safety Related Traffic Information (SRTI) event. In addition to this feed, the MoU also requires participating private service providers, to handover their SRTI to the public authorities.

For the services and information for road users, we distinguish between broadcasting and narrowcasting. Broadcasting is primarily done by the road operators using the existing distribution channels (DATEX II and VMS in all situations and additionally radio or television messages only with high impact events). For narrowcasting the NDW can facilitate the exchange between different parties as an access point. This allows service providers an easy way to use, for example, vehicle sensor data and to create services that enhance road safety.

Evidently, parties are free to discuss any other terms and conditions for the usage of level 2 information via a direct business-to-business (B2B) agreement.

The Netherlands is also looking into joining forces with other NAPs to perhaps collectively build the intelligence needed to create these services. The Program Support Action (PSA) regarding the Harmonization of National Bodies and National Access Points is likely to be a platform to further explore such a cooperation.

Additional information such as the MoU and the status report 2019 can be found on www.dataforroadsafety.eu.

The Netherlands does see the necessity to enhance the enforcement of the priority Action C, but sees European guidance and/or collaboration in this field necessary.

2.5 Reporting obligation under Delegated Regulation (EU) No 2015/758 on the Provision of 112 eCall (priority action d)

The Ministry of Justice and Security, specifically the National Police, is responsible for implementing the 112-facility. As of April 1, 2018, eCalls can be received directly by the national 112-control centre. The Telecom agency has been designated by the Ministry of Justice and Security as a National Body within the framework of the eCall obligations.

If there is an automatic eCall from the car, a message is sent via the voice connection, or 'minimum set of data' (MSD), at the 112-control centre. The message is sent via an application at the 112 exchange screen and shows the following information: vehicle identification number, car manufacturer, number of occupants, location information and direction of travel, and fuel type. The message does not contain any personal information. eCall uses the mobile network and brings – using in-car microphones and speakers – a voice connection between the occupants and the 112 control panel. This allows victims to explain their situation to the operator.

Looking back, the implementation of eCall was at some points somewhat challenging. One of the reasons was the prescribed use of 2G technology. Currently, the use of 4G technology is common in the Netherlands and recently even 5G has been rolled out by telecom parties. The mismatch in technology caused difficulties with the connection to the existing systems. In order to keep projects like eCall up-to-date, it is suggested to only prescribe the functionalities and not the technology for implementation.

The above described process shows that 112 eCall is fully implemented. In addition, the Netherlands participates in the project SAFE, which looks at aftermarket solutions with the aim of fastening the implementation of eCall in existing vehicles.

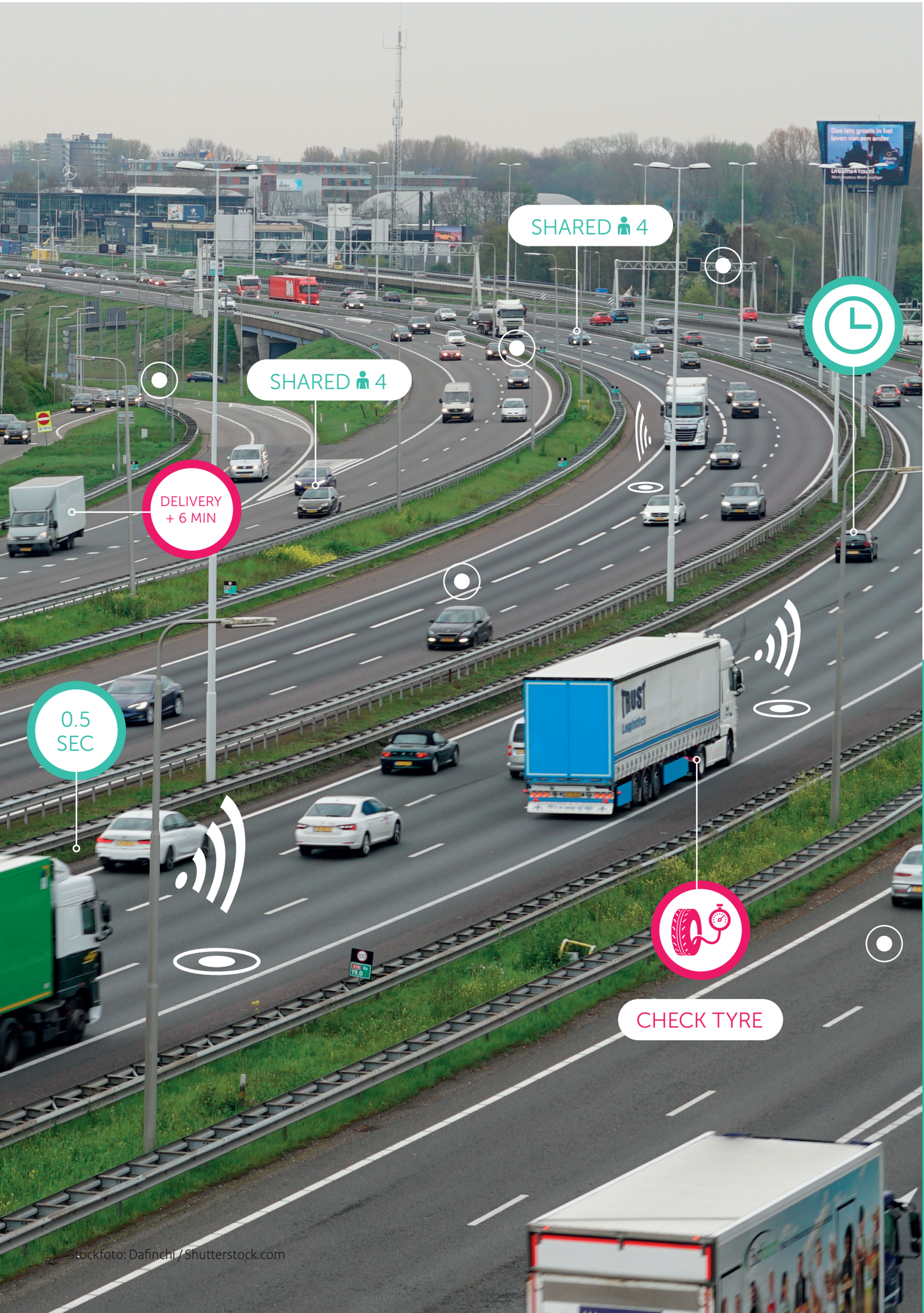
2.6 Reporting obligation under Delegated Regulation (EU) No 885/2013 on the Provision of Information Services for Safe and Secure Parking Places for Trucks and Commercial Vehicles (priority action e)

In 2015, the NAP was loaded with a readily available basic list of truck parking sites in NL. The collection and improvement of the database started in 2017. The NAP operates the database with truck parking information, from which service providers can search the metadata of all truck parking areas.
The number of different parking places and parking spaces:

- 326 parking areas with 8.237 freight parking lots
- 75% are registered in the NAP (100% public parkings and 55% private parkings)
- 5 parking areas (1,5% of the total) also provide dynamic information

Additionally, for BREXIT a number of emergency parking areas are being realized near ports of Rotterdam and Flushing. About half of these parking areas are added to the database.
Moreover, the following developments should be mentioned regarding this Delegated Act:

- Some parking areas are deleted at the request of (truck) restaurants with parking places, as they only allow truck drivers to use the parking area if they make use of the restaurant facilities.
- The following quality improvement activities have been made:
  - Visit of all sites with more than 35 parking lots;
  - Desk research (internet, documents) and detailed check with recent satellite and 360-degree images (street view);
  - Extra site visits (in case of missing or conflicting data);
  - Yearly check-up with regional Rijkswaterstaat departments for recent amendments.
- An assessment has been made for private truck parking areas. An assessment on the ground truth of the public parking areas was not conducted since the continuous data collection methods provide full coverage of location and information.



Stockfoto: Dafinchi / Shutterstock.com

3
Projects, Activities and Initiatives

3.1 Introduction

This chapter presents a selection of relevant projects, activities and initiatives in the field of ITS that have been launched or completed in the Netherlands since 2017. As mentioned before, the Netherlands has shifted its focus from testing towards implementing. Therefore, the number of projects initiated in the last three years has decreased, but they are larger in scale. The current projects focus more on the implementation of ITS services, which result in a higher impact on the Dutch mobility system.

Besides the central government, many regional and local authorities are increasingly incorporating ITS into their plans as a potential solution for societal issues. They are playing an active part in national programs or taking the initiative themselves by encouraging ITS developments. As was mentioned before, private parties are also working intensively on the development of ITS in the Netherlands, either independently or in public-private partnership. Furthermore, public authorities and private parties are investing in the management and maintenance of existing traffic management systems and are working together to optimise them on an ongoing basis.

For each priority area outlined in the ITS Action Plan 2017-2020, the developments that can currently be observed are described. This is done by analysing the projects, activities and initiatives that are under way and have been partially completed. In addition to signature projects presented below, appendix 2 presents a table containing a complete overview of all the projects started and/or completed over the 2017-2020 period. The progress made by the Netherlands is described for each of the projects. A common description of the project or activity has been given in the previous report.

The following priority areas are covered in this chapter:
- Priority area 1: Optimal use of road, traffic and travel data;
- Priority area 2: Continuity of traffic and freight management ITS services;
- Priority area 3: ITS road safety and security applications;
- Priority area 4: Linking the vehicle with the transport infrastructure.

3.2 Priority area I. Optimal use of Road, Traffic and Travel Data

3.2.1 Progress Since 2017

Compared to the previous progress report (2014-2017), there is a lot more multimodal travel information and data available in the Netherlands. This is a result of the increase of data-exchange between public parties and data-exchange between public and private parties. The increase of data-exchange has been made possible due to intensive cooperation. This has enhanced the available (real-time) traffic information and the data-landscape at the public side.

Example of cooperation

The Dutch government has intensified its cooperation with the Service House for Parking Rights and Residence Rights (‘Servicehuis Parkeer- en Verblijfsrechten’, SHPV). They are responsible for the law enforcement in the parking domain and are also the assigning party towards the RDW regarding the Parking Register in the Netherlands. For the last step in the cooperation, parties have agreed upon cooperating regarding the regular and automatic exchange of data. This entails dynamic data as well as static data, mainly about car parking. In the future, hospital parking lots and truck parking will be added.

The Dutch government is working more and more digitally, increases its service provision by predicting traffic rather than acting reactive and informs a broad audience (citizens, companies, etc.) about its activities. The use of data that originates from the vehicles itself is increases, while progress is continuously being made.

An important issue in the potential scale-up of technologies and the interoperability between different technologies, is the fact that ITS services should be implemented cross-border. Therefore, standardization at the international level is necessary as well as cooperating with service providers and the automotive sector. In the Netherlands, valuable knowledge is being obtained regarding these harmonization and standardization issues through public-private partnerships, such as the Partnership Talking Traffic.

3.2.2 Description of Activities and Projects

IDACS	
Stakeholders:	16 EU Member States.
Status:	In progress.
Area of impact:	European.
Expenses:	Mostly public.
Discription:	
IDACS stands for "ID and Data Collection for Sustainable fuels in Europe" and entails data collection related to recharging/refuelling points for alternative fuels and the unique identification codes related to e-Mobility actors. The project started in January 2019. Partnership countries mean to establish, at national levels, a uniform methodological approach identifying and monitoring the existing and emerging charging infrastructure for electric vehicles and vehicles to other alternative fuel sources within three years. Participating Member States are the Netherlands, Belgium, Luxembourg, Germany, Poland, Austria, Croatia, United Kingdom, Spain, Lithuania, Czech Republic, Hungary, Portugal, France, Greece and Slovenia. The Netherlands is the coordinator of IDACS.	
Targets:	
The goal of IDACS is to harmonize ID code format solutions for electro mobility providers and charging station operators. Some countries already have a system of code generation in place (for example the Netherlands, France, Germany and Austria). In short, the 16 Member States come together to: - set up harmonised e-mobility Identification Codes for Charging Point Operators and e-mobility service providers; - implement ID registration repository for exchanging information on these e-mobility ID codes; - ensure that all data of infrastructure for electricity and hydrogen are made available through the NAPs. The development of a common ID code database will allow information exchange between Member States and ensure that no duplication of codes occurs, obtaining missing information on electric and hydrogen filling stations (optional for other alternative fuels) and ensuring that all information is made available through national contact points (in accordance with ITS Directive 2010/40/EU). Moreover, the development of a European e-mobility unique identification (ID) code system results in harmonization. These ID codes would uniquely identify the charging operators and e-mobility service providers at EU level, for the purpose of identifying the contract, charging station, charging provider.	
Results:	
In the Netherlands there is already a system of code generation in place. Shortly after the start of the project other countries have started to collect on charging stations from charging infrastructure operators.	

Partnership Talking Traffic

Stakeholders:	The Partnership Talking Traffic is a collaboration between the Dutch Ministry of Infrastructure and Water Management, 60 regional and local authorities and national and international private companies. The private parties are: BeMobile, Dynniq, Sweco, Ericsson, Flitsmeister, Kohartog, KPN, Locatienet MobieleTV.nl, Monotch, Roadeo, Royal Haskoning DHV, Siemens, Simacan Swarco, T-Systems, Vialis, V-Tron, Ziut.
Status:	In progress.
Area of impact:	National.
Expenses:	Public parties invest €55mln and private parties €45mln.

Discription:

The partners active in the Partnership Talking Traffic are working together to accelerate development and deployment with regard to retrieving and organising traffic light data (cluster 1), to process, enrich and distribute a wide variety of data and convert this into real-time and made-to-measure data sets and information (cluster 2) and to provide this information to a wide variety of road users (cluster 3) though their smart phones, PNDs and in-car systems. This joint co-investment program seeks to enhance the availability of intelligent data for a wide group of road users (cars, trucks, public transport, emergency services, cyclists). This way, the safety and sustainability of traffic and transport can be enhanced resulting in the reduction of travel times and, eventually, lower public expenditure.
Mixing global and local players in this Partnership speeds up development and deployment of new driver assistance services and lays the groundwork for the next levels in connected and automated driving while delivering new services from the beginning of 2018 onwards.

Targets:

Concrete types of data that are becoming available to road users:
- In-vehicle signage and speed advice;
- Individual real-time data on potentially dangerous situations and road work warnings;
- Prioritising (conditioned and general) of groups of road users at traffic lights;
- Provide road users with real-time data from traffic lights (first 20% of all Dutch TLIs);
- Optimising traffic flows through traffic light;
- In-car parking data .

All these developments will make it possible to not only improve traffic flow, but also to improve traffic safety. Road users will be able to anticipate changing conditions during their trip. Travelling times will be reduced. Emissions will be lowered. In short, mobility, accessibility and liveability will improve and the number of traffic accidents will be strongly reduced.

Results:

The Partnership is still in progress. July 2020 some first results have been communicated:

Roads:
- 33% coverage of static traffic signs (geolocation, road name, community, image);
- 90% data available on off-street parking (location, tariffs, access points, opening hours, capacity and real-time occupancy);
- 98% data available of variable message signs (dynamic speed limits, lanes open/closed);
- 99% data available regarding bridge statuses on the main road network (open/closed);
- 35% of road authorities provide data for logistics (parking and (un)loading, truck access restrictions, delivery time windows);
- 62% of ordered intelligent traffic lights are operational.

Vehicles:
- 35% of the emergency vehicles can communicate their current vehicle position, direction and request priority at intersections with intelligent traffic lights;
- 500.000 vehicles provide various vehicle data for road safety;
- 1.7 million vehicles equipped with an information service that enables them to send CAM-messages to intelligent traffic lights.

The results are according to plan for the first phase of the project.

Seven nation-wide MaaS-pilots	
Stakeholders:	The ministry, seven regions and 24 selected consortia.
Status:	In progress.
Area of impact:	Regional pilots that are nationally scalable.
Expenses:	Public and private.

Discription:

The Ministry of Infrastructure and Water Management has worked together with seven regions to develop seven nationally scalable MaaS pilot projects. These will start from:

- The Zuidas in Amsterdam;
- Utrecht Leidsche Rijn, Vleuten and De Meern;
- Twente;
- Groningen-Drenthe;
- Rotterdam-Den Haag (including Rotterdam The Hague Airport);
- Eindhoven;
- Limburg.

All of the pilots should make it possible to travel throughout the Netherlands with the option of using any of the transport methods that are available[14]. Large numbers are crucial (minimum of 50,000 users per app): without this kind of scale, there will be limited effect and little opportunity to make a positive business case. Each pilot project focuses on a different policy objective, covering themes from accessibility and social inclusion to sustainability, cross-border transportation and reducing congestion. In 2018, the ministry tendered a framework agreement and selected 24 consortia. These consist of parties that are already actively involved in mobility sharing or with MaaS in some way, such as IT and platform parties, banks and insurance companies, start-ups, and public transport, mobility and automobile companies. The pilot projects are carried out from 2019 onwards until the end of 2021.

The party that is selected must of course develop a user-friendly, trouble-free app that can be used for planning, booking, paying for and actually making a journey. Another requirement is that both the selected party and the transport operators involved must share the data that they gather with one another and the governmental organisations – while naturally also safeguarding the users' privacy. A further condition for each and every project is that once it has been running for two or three years, the MaaS provider must be able to finance it without additional public financial support.

Targets:

The ministry and the seven regions have formulated the following goals:

- To link travel data and make available seven user-friendly apps that enable travellers to choose between all possible combinations of transport options and to plan, book and pay for them. Travellers' privacy shall hereby be guaranteed;
- To gain experience in MaaS, to learn from it and to spread knowledge about mobility, for which good applications and a sufficient number of users are essential conditions;
- To use MaaS to take a first step towards a sustainable transportation future, whereby possession is less important and service provision therefore more important.

Results:

Results are expected once the pilots are completed.

14 To learn more about the content of the different pilots, see: https://dutchmobilityinnovations.com/spaces/1105/maas-programma/files/20942/mobility-as-a-service-regional-pilots-eng-pdf

3.3 Priority Area II. Continuity of Traffic and Freight Management ITS Services

3.3.1 Progress Since 2017

Traffic management

Rijkswaterstaat fulfils their traffic management duties by seven network services: Object Control, Incident Management, Road Works, De-icing, Enforcement, Network Optimisation, and Travel and Route Information. The Directorate-General has written a 'Roadmap Traffic Management 2022: Improving the network services and renewal based on Smart Mobility' (June 2018)[15]. This roadmap gives the transition substance based on the Vision on Traffic Management 2030 and the Smart Mobility Position Paper of Rijkswaterstaat.

The roadmap describes how Rijkswaterstaat can adapt to continue adding as much societal value as possible to traffic management in the future. Improvement by optimizing and developing traffic management has a different focus for the various network services, depending on a more direct or perhaps indirect contribution to safety and traffic flow. De-icing, Incident Management and Road Works will have to deliver a higher quality product or service, whilst improving and developing Object Control will focus on efficiency. Finally, Network Optimisation, Travel and Route Information and Enforcement should focus more on cooperation, so that partners can make an optimum contribution to traffic flow and safety together. Rijkswaterstaat describes that the transition towards smart mobility can succeed by performing activities along four tracks:

- Exchanging and using data (e.g. data from others): Among other things, the Directorate-General will make the data they produce themselves available to everyone, reliably and in high quality. Moreover, they will prepare themselves to be able to receive and process relevant data (see CHARM, appendix 2);
- Developing assets (e.g. smarter roadside systems): Among other things, Rijkswaterstaat will prepare its assets for future developments (e.g. ITS);
- Influencing the behaviour of road users: Among other things, the behaviour of road users will be understood on the road as well as before their journey (decision-making regarding the use of modalities);
- Cooperating with partners: Among other things, collaborations are made with the National Council Traffic Management (LVMB) and the National Council Road Operators (WOW) and with private parties.

Freight management

Besides the efforts with regards to traffic management, the Netherlands also made a step further regarding freight management. The Dutch ministry organized an international market consultation on the subject of 5G in the mobility sector. This has gained many insights for the ministry regarding discussed use cases, challenges being faced, the network technology, and the business case[16]. As a result, the ministry made a project proposition for Horizon2020, of which the Grant Agreement was signed 9th of June 2020. The project proposition 5G Blueprint is an international study into the technology, organisation and business case for remotely operated transport in logistics and transportation – on the road as well as on water. The project received a grant of €10mln. and involves a public-private partnership where the Netherlands, the Belgian province Flanders, Switzerland, the Czech Republic, and companies from the transport-, telecom- and IT-industry are active in. The project starts September 2020 and will run for three years[17].

15 http://publicaties.minienm.nl/documenten/traffic-management-roadmap-2022-improving-the-network-services-renewal-based-on-smart-mobility

16 Full documented insights can be found at: https://dutchmobilityinnovations.com/spaces/86/dutch-mobility-innovations/files/27572/ienw-results-market-consultation-5g-in-mobility-pdf

17 More information can be found at: https://dutchmobilityinnovations.com/spaces/86/dutch-mobility-innovations/articles/press-release/32784/5g-blueprint-eng-pressrelease

3.3.2 Description of the Activities and Projects

The European ITS Platform (EU-EIP) and ITS corridors	
Stakeholders:	National ministries, Road Authorities, Road Operators and partners from the private and public sectors of almost all EU Member States and neighbouring countries.
Status:	In progress.
Area of impact:	European.
Expenses:	Public and private.

Discription:

Together with road operators and their public and private partners from most member states, the national road operator Rijkswaterstaat, with other partners in the Netherlands, e.g. the port of Rotterdam, is a very active participant in the CEF-ITS implementation program. The implementation program covers EU-EIP and so-called ITS corridors, which cater for seamless, harmonized services along European corridors.

The European ITS Platform (EU-EIP, www.its-platform.eu) is the knowledge centre where the partners monitor and evaluate progress in the corridors, define practice-based standards and guidelines, exchange best practices and provide input for European policy and regulation.

In the ITS corridors Ursa Major and Arc Atlantique implementation projects of harmonized ITS are contributing to the digitalization of the TEN-T Core Network Corridors (CNC) and wider networks. Ursa Major, together with Germany and Italy, covering the Rhine Alpine CNC includes ITS projects in ports next to roads and focuses on ITS for freight. Arc Atlantique, running from Ireland and UK all along the Atlantic board down to Portugal focuses on Travel Information Systems (TIS).

One more example of community building is the East West Corridor initiative (www.eastwestcorridor.eu), where partners from Ireland to the Baltic states exchange knowledge and work together on accommodating freight transport which considerably increased since they joined the Schengen area. A specific tool introduced is the up-to-date intermodal route planner for containers, which covers more than 90% of all transfer points and operators in Europe. With an inventory of national ITS plans and projects and organizing cross-border communication for traffic management, this all prepares for further coverage of the North Sea Baltic CNC with ITS.

Targets:

In order to foster cooperation and the necessary consensus between EU Member States, the EU ITS Platform will facilitate the establishment of a commonly understood state of the art and promoting the actual take-up of EU specifications, guidelines, best practices and/or methodologies.
The EU ITS Platform focuses the cooperation on 5 Activities:

- Activity 1 – EU ITS Platform Governance and Management
- Activity 2 – Monitoring and Dissemination (including ITS Deployment Guidelines)
- Activity 3 – Feasibility study East-West Corridor and first pilot implementation
- Activity 4 – Harmonization Cluster
- Activity 5 – Evaluation

Results:

EIP
Key achievements of EU-EIP are the European Reference Handbook for the deployment of harmonized ITS core services, an improved mechanism for cross-corridor cooperation, EC-compliant KPIs for ITS deployment and benefits, the ITS toolkit, and the evaluation library, the community building of National Access Points, innovation timelines and deployment roadmaps, information services quality frameworks and assessment methods, physical and digital infrastructure attributes for automated driving, good practices how to automate road operator's own ITS and integrating C-ITS into road operators day-to-day business.
-->

Results:

Moreover, 31 National Access Point operators and National Bodies from 14 different countries met at the LEF Future Centre in Utrecht (the Netherlands) on 30 October 2019.
Additionally, in 2018 around 300 experts from 21 different countries met on 14/15 November to exchange views on 'Traffic Management in a changing world' during the ITS Forum 2018. This Forum was organised by the European ITS Platform and the ITS Corridor projects and was hosted by Rijkswaterstaat in the LEF Future Centre in Utrecht (the Netherlands).

Arc Atlantique
In May 2020, Rijkswaterstaat achieved a new milestone in its traffic centre located in Rhoon (close to Rotterdam). The Site Acceptation Test of the video analysis system was successfully completed, which is an important step in this Proof of Concept of the Smart Cameras project.

In 2019, Rijkswaterstaat carried out a study with smart cameras to monitor the situation on the road. In the same year the European ITS Platform (EU EIP) and Arc Atlantique project (AA3) has organised a Special Interest Session at ITS Congress Eindhoven on Traffic Management in a changing world – fulfilling ITS promises.

In 2018, a market consultation was carried out and specifications of the Smart Cameras were developed.

Ursa Major
As part of the Ursa Major neo project Rijkswaterstaat tested eight intelligent roadside units (iR-SUs) in July 2018 in existing operational circumstances. In December 2018, another 20 iRSUs were installed to be used for the real-life pilot using floating car data instead of induction loops. Goal of the pilot was the application of this relatively new data source for 'real time' traffic management purposes ('slow vehicle warning').

The Experience Week is part of the preparatory phase of the truck platooning pilot of the Ursa Major neo project. In this context, the Experience Week Connected Transport was organised from 1 - 5 October 2018 in the Netherlands.

3.4 Priority Area III. ITS Road Safety and Security Applications

3.4.1 Progress Since 2017

Important progress on road safety has been made with the Memorandum of Understanding (MoU) signed by all participating members of the European Data Task Force (see paragraph 1.3). The MoU provides the basis for the proof of concept and aims to facilitate a fair and trusted partnership. It is based on the principle of reciprocity where safety data will be offered in return for safety services[18].

As was stated in the progress report 2014-2017, we are facing issues in the area of road safety. To deal with these issues, the Dutch government worked out a strategic plan on traffic safety 2030 ('Het strategisch Plan Verkeersveiligheid 2030 Veilig van deur tot deur') and how smart solutions can increase safety. The most important example is that we prioritize through data analyses on possible risks, which results in a more risk-based approach.

The past few years we have seen that important data features of registered accidents have increased, such as the location, transport modes involved, and the actual driven speeds. Due to the increase of available data, road authorities can analyse and try to predict where and what types of accidents may happen and how risks can be mitigated. Work is still underway on further improvement on the registration of accident characteristics and the development of data over time.

18 https://www.dataforroadsafety.eu/

Moreover, the Dutch government is increasingly using data that is collected by vehicles. Vehicles may give access to relevant information, for example regarding speed, other road users, the weather conditions and incidents. Currently, floating-car data of about 500.000 cars is being collected and analysed for safety measures. Vehicles collect data in different ways: by smart road maps or board detection, by being connected to the infrastructure or to other vehicles and/ or by driving together.

Besides the expansion of data collection, the quality of data has improved as well. This makes it possible to turn reactive policy into proactive policy, also aimed on preventing accidents[19].

3.4.2 Description of Activities and Projects

Pilot Tyre Pressure System A16	
Stakeholders:	The trial is being carried out by Rijkswaterstaat in collaboration with a public-private partnership (called the 'Verkeersonderneming'). The pilot is part of Ursa Major neo.
Status:	In progress.
Area of impact:	National.
Expenses:	Ministry of Infrastructure and Water Management, the Rotterdam The Hague Metropolitan Area (MRDH), Port of Rotterdam (HBR), Municipality of Rotterdam, European Union, Ursa Major neo.
Discription:	
Rijkswaterstaat has installed a tyre pressure measuring system for a one-year pilot on the A16 motorway, south of Rotterdam. With this pilot the Verkeersonderneming and Rijkswaterstaat strive to detect truck tyres which are punctured and/or have low pressure in an early stage.	
Targets:	
The aim of the pilot is to decrease the occurrence of tyre-related incidents with trucks on the road. The approach of the pilot consists of the following activities: - Measurement of deviations in tyre pressure; - Informing relevant parties about these deviations; - Control and, if necessary, recovery of tyres by those involved; - Analysis to gain a better understanding of the problem.	
Results:	
During the second phase (December 2018 to May 2019) the following activities were carried out: - Extension of the system; - Informing participating companies in the event of a deviation; - Optimise pressure measurement. Based on phase 2, the general picture is that there is a high reliability detecting flat tyres. It is concluded that 'suspects' (single tyres) are more difficult to measure. Also, a relatively high percentage of deviations has been identified in the vehicle category 'single-unit truck' with four or more axles and tractor unit with several drawbar trailers[20]. At the moment phase 3 is carried out. There are now 201 participants participating with a total of 39.765 license plates. More participants are being added. In the near future the evaluation of the third phase will be carried out and results will be announced.	

19 https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/rapporten/2018/12/05/bijlage-1-het-strategisch-plan-verkeersveiligheid-2030-veilig-van-deur-tot-deur/Bijlage+1+Het+strategisch+Plan+Verkeersveiligheid+2030+Veilig+van+deur+tot+deur.pdf

20 https://www.its-platform.eu/highlights/tyre-pressure-measuring-system-%E2%80%93-phase-3-umneo-pilot-started-results-phase-2-available

SmartWayz.NL	
Stakeholders:	The board exists of the following parties: Ministry of Infrastructure and Water Management, Province Noord-Brabant, Rijkswaterstaat, Province Limburg, Metropoolregio Eindhoven, Municipality Eindhoven, TU Eindhoven, Dinalog, NXP, Foundation Brainport, Economic Board West-Brabant, SMART Logistics Centre Venlo, Ministry of Home Affairs and Kingdom Relations.
Status:	In progress.
Area of impact:	National.
Expenses:	Mostly public.

Discription:

The SmartwayZ.NL mobility program consists of eight related sub-projects in North Brabant and Limburg and focusses on the Breda-Venlo corridor (A58, A2, A67), the A2 Weert-Eindhoven, the N279 Veghel-Asten and the south-east Brabant region. The projects aim to improve accessibility and traffic flow. The project approach ranges from smart mobility solutions to the widening of motorways and the tackling of transport hubs. The activities regarding smart mobility are relevant in the context of this progress report. The program supports companies that want to test, improve and roll-out smart mobility solutions on a larger scale. There are different smart mobility sub-projects, such as:

- Mobility Lab offers start-ups facilities to test their prototype in practice;
- MobilitymoveZ.NL offers facilities to private parties to test mobility concepts on a large scale. Techniques come together around connected and automated driving, electric transport and partial concepts;
- Mobility Market: supports providers of smart mobility services;
- Smart Logistics: realises better and smarter organization of goods flows;
- Traffic management: optimizes the current traffic management system.

The program SmartWayz runs until 2026.

Targets:

SmartWayz's main objectives are:

- To promote innovations;
- To improve the flow;
- To achieve good operational processes;
- Liveability;
- Traffic safety.

In the field of smart mobility, the ambition is to realise the smartest road network in Europe, which will penetrate to the centre of the cities in the south of the Netherlands. In 9 to 10 years, 50% of travellers, 10-20% of (mostly international) freight traffic and 30-40% of distribution freight traffic within the geographical scope will use smart mobility services[21].

Results:

Examples of results that were stated in the latest report (2019):

- SmartWayz: The "smart" tyre pressure gauge on the N279 Asten-Veghel is taken into use on 13th of October 2019. This is a sub-project of SmartwayZ.NL and was carried out by Heijmans Infra. The tyre pressure gauge provides real-time insight into the possible deviation of a tyre from a truck;
- Mobility Lab: A total of 180 start-ups registered for Mobility Lab during the three editions. Thirty-seven were selected to test their prototype in practice. Thirty-four start-ups were still active in 2019. Together they created 265 jobs. Start-ups received a total of € 500.000 in financial support from the Mobility Lab;
- MobilitymoveZ: The province of Noord-Brabant and Beijer Automotive have conducted a trial called Smart Asset Management where data from vehicles is used to determine the condition of the road. That information makes it possible to take action earlier and to repair malfunctions of the road. At the end of 2019, the next step was to investigate whether data from vehicles could be used to increase safety.

For more results please visit the following website: https://www.smartwayz.nl/en/smart-mobility/

21 https://www.smartwayz.nl/media/1739/vgr-7-smartwayznl.pdf

3.5 Priority Area IV. Linking the Vehicle With the Transport Infrastructure

3.5.1 Progress Since 2017

We have been preparing the road infrastructure for the next generation of vehicles. We have seen that Rijkswaterstaat and its fellow road operators have become more and more involved with car manufacturers in order to follow the pace of developments and their requirements and wishes for the public infrastructure. Increasingly, it is investigated how data from car manufacturers can be used for the infrastructure. These include lines, signs and data distribution, and monitoring how the traffic system will behave in the transition period.

Autonomous vehicles and the systems that are required in or along the road have consequences for the design, construction and maintenance of infrastructure. This concerns both the physical road infrastructure and the digital components. See paragraph 3.6 for more information on the self-driving car.

In the past few years, there has been a lot of discussion between service providers and automotive enterprises about what will become the dominant technology (WiFi P or 5G). However, the many projects, experiments and tests have contributed to the insights and knowledge about the different forms of technology. For example, the approach and the collected infra-data thanks to projects like C-ITS services are the profits which are now being redeemed.

3.5.2 Description of Activities and Projects

Concorda	
Stakeholders:	The project consortium consists of 26 international partners from the Netherlands, Germany, Belgium, Spain and France. In Amsterdam, there is close collaboration with Fiat Chrysler (FCA/CRF) and NXP.
Status:	In progress.
Area of impact:	International.
Expenses:	€48 million in total, €24 million in co-funding from the Connected Eu-rope Facility (CEF).
Discription:	
The Concorda (Connected Corridor for Driving Automation) project works towards the preparation of European motorways for automated driving and high-density truck platooning. Concorda's priority is to analyse the interoperability of technologies enabling vehicle-to-everything (V2X) communication under real traffic conditions[22]. The project entails testing at sites in the Netherlands, Belgium, France, Germany, and Spain, with an aim to improve interoperability. The interoperability will be developed along three lines, namely on: (1) system architecture and technologies, (2) services, and (3) implementation, leading to a commonly-agreed set of profiles, specifications and (proposals for) standards. Some of the pilot projects will be carried out at various locations in the Netherlands. In the Amsterdam Metropolitan Area, self-driving cars are tested, whereas in North-Brabant the emphasis is on the advancement of cellular communication technology and super-GPS (very precise localisation). -->	

22 https://connectedautomateddriving.eu/mediaroom/Concorda-towards-automated-driving-on-european-motorways/

Targets:
The objective of the cross-border activity will be to identify interoperability issues on paper and in practice, while quantifying the foreseen interoperability issues and identifying new practical issues. These will be used further as input for the re-development of the profiles and (new, if necessary) specifications. In Concorda, established car manufacturers, major telecom providers and the most important suppliers work together with road authorities, governments and knowledge institutions to gain a common understanding of all the practical organisational and technical challenges[23].
Results:
The project was launched in 2017. After the first and second technical workshops were organised in January and June 2018, a third workshop was hosted in Brussels on 7 November 2018, followed by Concorda's first General Assembly on 8 November 2018. During the workshop, the consortium analysed the progress of Concorda's ongoing activities as well as future steps. Consortium partners further discussed the cooperation options for the project with other initiatives and debated about the alignment of Concorda with other projects and several other EU initiatives. The possible exploitation avenues for the Concorda application will be analysed in more detail towards the end of the project in June 2020[24].

SOCRATES 2.0

Stakeholders:	BASt, BEMobile, BMW, Brandmkrs, City of Copenhagen, HERE Technologies, MAPtm, MOW Vlaanderen, Rijkswaterstaat, Technolution, TomTom.
Status:	In progress.
Area of impact:	National and international.
Expenses:	A total budget of € 10.971.500.

Discription:

SOCRATES2.0 stands for 'System of Coordinated Roadside and Automotive Services for Traffic Efficiency and Safety'. It is a European cooperation of road authorities, service providers and car manufacturers. Together they are working on new standards to share and integrate traffic information. This is the first public and private cooperation focusing on technical pilots. The project performs the following activities with Rijkswaterstaat as project leader:

- **Framework design:** The objective of this activity is to achieve a shared vision about interactive traffic management between the partners and to commonly define a frame-work for public-private cooperation in traffic management. The framework design is a strategic approach to define a shared vision and a proposed future cooperation frame-work for interactive traffic management;
- **Pilot Designs:** The objective of this activity is to commonly design the concepts and functions of the pilots. The project will commonly design the intermediaries and specify the 'track me' protocol;
- **Implementation of the pilots:** The objective of this activity is to develop, test and evaluate interactive traffic management based on a close cooperation of road authorities, service providers and car industries in the Amsterdam, Copenhagen, Munich and Antwerp region. This will be done based on a selection of use cases and the subsequent pilot design, by realising (changes to the) sub-systems, performing system integration tests and operate the sub-systems during the integration tests and the evaluation period;
- **Evaluation:** The objective of this activity is to collect, analyse and evaluate measured data. This will provide answers to the evaluation questions, and it will provide proof of the actual operations of the SOCRATES2.0 concept;
- **Consolidation:** The objective of this activity is to validate the SOCRATES2.0 concept. The consortium partners and member group will[25].

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23 https://www.rijkswaterstaat.nl/english/mobility/projects/Concorda/index.aspx
24 https://connectedautomateddriving.eu/eucad2020/
25 https://socrates2.org/activities/consolidation

Targets:
SOCRATES2.0 aims at introducing traffic management in traffic information and navigation services anticipating the integration of these services in self-driving cars. This will improve car mobility by promoting cleaner, efficient and safe flow of traffic.
Results:
In preparation of the actual pilots, a framework on the cooperation has been delivered in July 2018. In September of the same year most of the work on pilot designs was finalised. The first pilots started in Q4 2018. In 2019, the main focus of the project was on the deployment of the pilots. For each pilot city so-called Focus Groups were installed, elaborating the information- and technical architectures. The first results of the pilots entail detailed sequence diagrams (generic, per partner/role, identifying interfaces), user stories (per use case/ role/partner) and interface descriptions. Based on this, involved partners elaborate on their own the application architecture (per use case/per function), technical architecture (per use case, per function) and terms and conditions of data usage. In this stage of the project, consistency in the pilot designs and actual deployment remains a challenge due to the fact that the work is being executed per use case per pilot site. By the end of 2019 all but one of the pilot sites are up- and running (stage 3). Last year, the work plan for the evaluation was drafted leading to the elaboration of the "Evaluation Plan", the "Data Collection Plan", a set of pilot sites, uses case, partner specific questionnaires and in-app surveys and the set-up of the data archive[26]. Due to the consequences of COVID-19, the evaluation of the pilots is postponed to the end of 2020.

3.6 Other Initiatives / Highlights

3.6.1 The Netherlands and the Self-driving Car

In the Progress Report 2014-2017, the development of the self-driving car and the Dutch activities were described. Vehicles that can largely drive independently on the main road network (autopilot and traffic jam assistant), truck platoons and shared buses that can cover specific routes at low speed (known as PODs/people movers) are expected to be on the roads in the foreseeable future.

To admit these new vehicles into the Dutch traffic system in a responsible and safe way, existing national and international legislation and regulations must be amended. Software is taking over the driver's role to an increasing extent, which means that the software determines the vehicle's behaviour. During the course of its lifespan, this software receives updates, often over the air (wireless). We need appropriate and verifiable functional requirements for vehicle behaviour, via which the vehicle can demonstrate safe participation in traffic. At national and international levels, the Netherlands is working with public authorities and market participants on these criteria and requirements. Special attention is given to the interaction between the vehicle and its occupant/driver, as well as the automated vehicle's driving behaviour and its interaction with other (conventional) vehicles and vulnerable road users, since these skills should be part of a future 'driving licence of the self-driving car'.

Since 2015, a legal framework makes it possible to experiment with self-driving vehicles. Currently, a number of 88 parties have used this framework. Fulfilling additional needs, a legal framework has been put in place as of July 2019 that makes it possible to perform tests with a vehicle where the driver is not situated inside the vehicle itself. The implementation of this Experimenting Law ('Experimenteerwet') is ongoing and has not yet resulted in official experiment applications.

26 202003232019 Yearly report Socrates V0.91


SHARED BIKE
PARK & RIDE
BOOKED 08:26
08.49 DEPARTURE CS
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ARRIVAL 08:37
NEXT STOP 45 SEC

4
Key Performance Indicators (KPIs)

As the previous chapters have shown, many initiatives, projects and progress are being under-taken related to ITS. It is interesting to see the impact of all these initiatives. In this chapter we make an attempt to quantify how widespread the deployment of ITS technology is in the road network and what the impact has been on travel times, road safety and emissions. The second point is especially tricky, since local effects are not necessarily transferable to a national scale, since every road, crossing and transport node is different. However, by showing the impact ITS had in different local situations, a general feel for the effects of ITS can be constructed.

4.1 Deployment of ITS Technology in the Road Network

In the progress report 2014-2017 the following figure was shown regarding the deployment of ITS technology:

Figure 1: Implementation of ITS technology on the Dutch road network

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 NDW 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 1.3.A** Real time traffic information via NDW and commercial services 100%	**OTHER MOTORWAYS 1.3B** Dynamic travel information via NDW 100%	**OTHER MOTORWAYS 1.3C** Freight information parking space utilisation 100%

Coverage of ITS technology was already at 100% in the TEN-T network and on motorways, with the exception of C-ITS technology. The last one was set at 0%, since C-ITS was in that period only implemented through experimental pilot projects. This general picture of the state of affairs has not changed since the previous report. However, upgrades were implemented, quality and accessibility improved and other advancements have been made. Bottom line is that on the 1.000 kilometre TEN-T roads, the other motorways and a large proportion of the secondary roads, the level of ITS is on a very high level. In the rest of this chapter we dive deeper into the different categories from the figure above.

4.1.1 Information Gathering Infrastructure (traffic monitoring/weather conditions etc.)

Information collection is available along 100% of the TEN-T road network and along 100% of the motorways. Information is gathered through physical infrastructure and through floating car data. For local roads, the exact coverage rate is unknown. However, since floating-car data is available, the coverage rate on most local roads is also 100%. Only on small, little-used roads coverage is not always available (due to privacy concerns).

Fixed information gathering infrastructure

The NDW collects, via roadside systems, real-time traffic data at 37.000 locations, along more than 10.000 kilometres of road, including all TEN-T and other motorways:

– 3.000 kilometres of main local roads in cities;
– 4.300 kilometres of provincial roads;
– 3.400 kilometres of motorways and other national 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.

Mobile information gathering infrastructure

In addition, the NDW procures floating-car data. Since February 2018, the travel times and speed of vehicles are measured and made available as open data. The coverage rate is practically 100% of the road network. The data is collected on all road types. The coverage rate is less on little-used roads: a minimum amount of cars are required to have driven on the road in a specific period before it is allowed to report the data.

4.1.2 Incident Detection

Rijkswaterstaat performs incident management on all motorways in the Netherlands on a 24/7 basis. Over 3.000 cameras are positioned alongside 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 Dutch 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. Also, a set of organizational and financial agreements are in place with all stakeholders involved, such as police, fire brigade, insurance companies, salvage crews, etc. E.g. salvage companies are paid for standby at critical spots along the motorways.

4.1.3 Traffic Management and Traffic Control Measures

Traffic management is performed on the entire motorway network on a 24/7 basis by traffic operators in five regional centres and one national traffic control centre. 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, 450 Dynamic Route Information Panels (DRIPs), 5.700 signalling/VMS locations, 123 ramp metering locations and over 3.000 cameras.

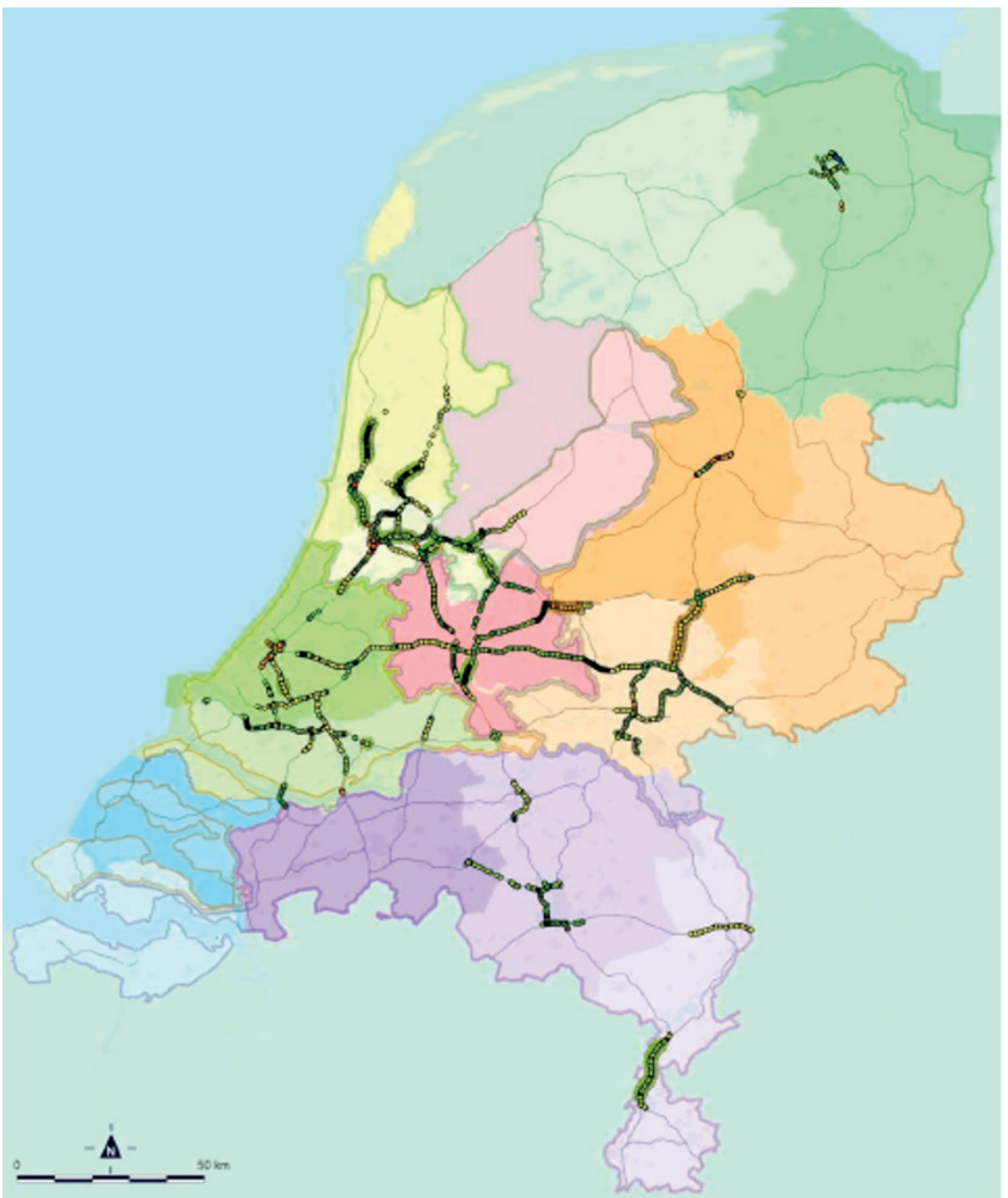
DRIPs are spread out across the Netherlands, with a concentration around the large cities: Amsterdam, Utrecht and Rotterdam.

Figure 2: location of DRIPs in the Netherlands[27]

27 'Verkeersmanagement Rijkswaterstaat in beeld' (2019)

The 3.000 cameras are similarly spaced, these are used for incident management and safety (CCTV).

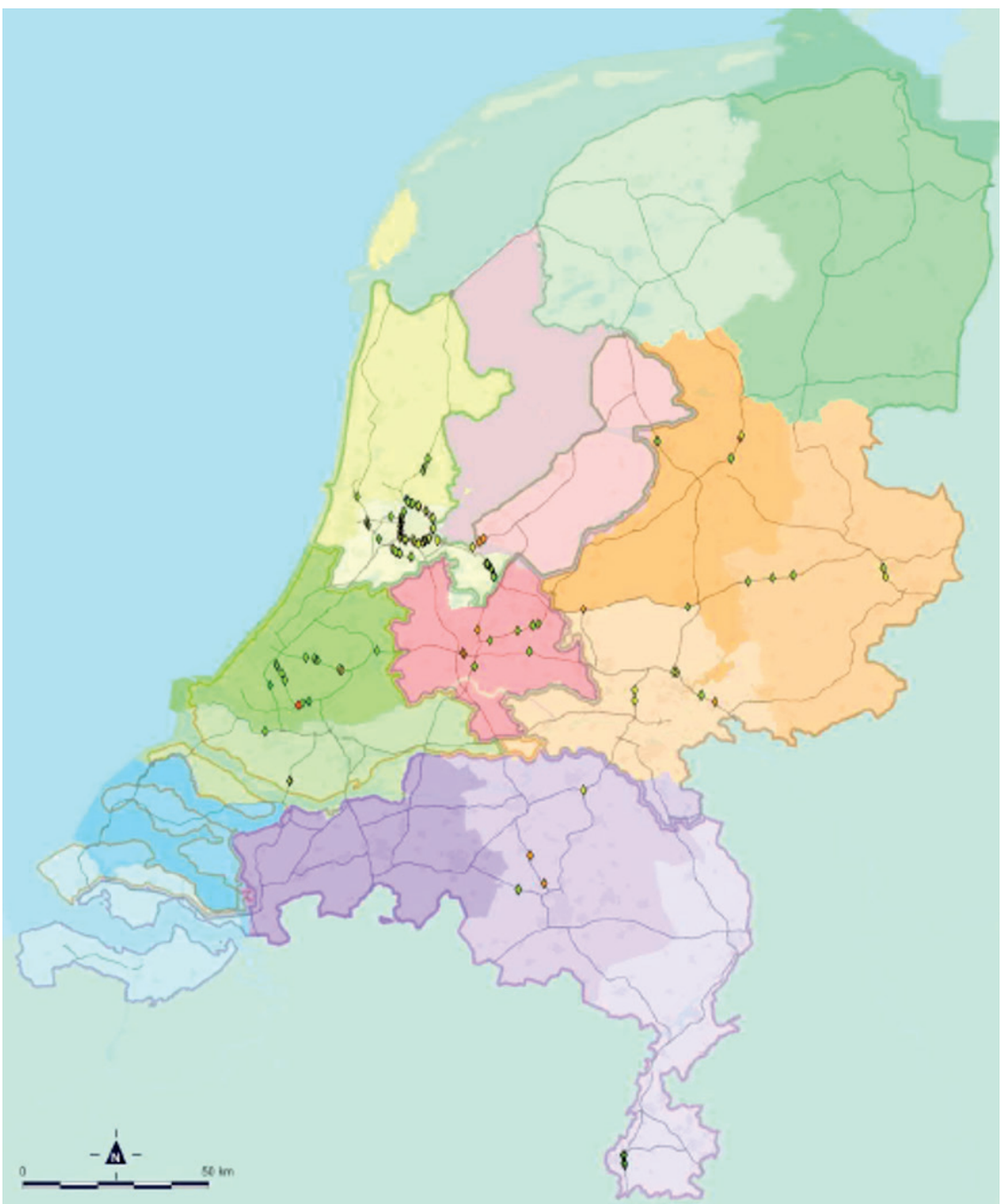
Figure 3: location of cameras in the Netherlands [28]



28 'Verkeersmanagement Rijkswaterstaat in beeld' (2019)

The 123 ramp metering locations are mostly concentrated in North-Holland.

Figure 4: ramp metering location in the Netherlands[29]



29 'Verkeersmanagement Rijkswaterstaat in beeld' (2019)

In addition, the Netherlands is now actively rolling out intelligent traffic control systems (iVRIs), which can interact with equipped vehicles. There are 521 active intelligent traffic control systems spread across the country (August 2020). About the same number is additionally installed and will be activated soon – and even more have been planned. Information on how many there are and where they are located is made publicly available online, which shows the following spread throughout the country:

Figure 5: intelligent traffic control systems in the Netherlands[30]

30 https://ivriportaal.nl/actieve-ivris/

4.1.4 Cooperative-ITS services and applications

The progress report 2014-2017 stated that C-ITS was so far only provided within pilots and it is not yet part of standard traffic management procedures. Since then, intelligent traffic control systems have been deployed as described in the previous section. A start has been made in the south of the Netherlands to prioritise groups of freight trucks at traffic lights through intelligent traffic control systems that can communicate with the trucks directly.

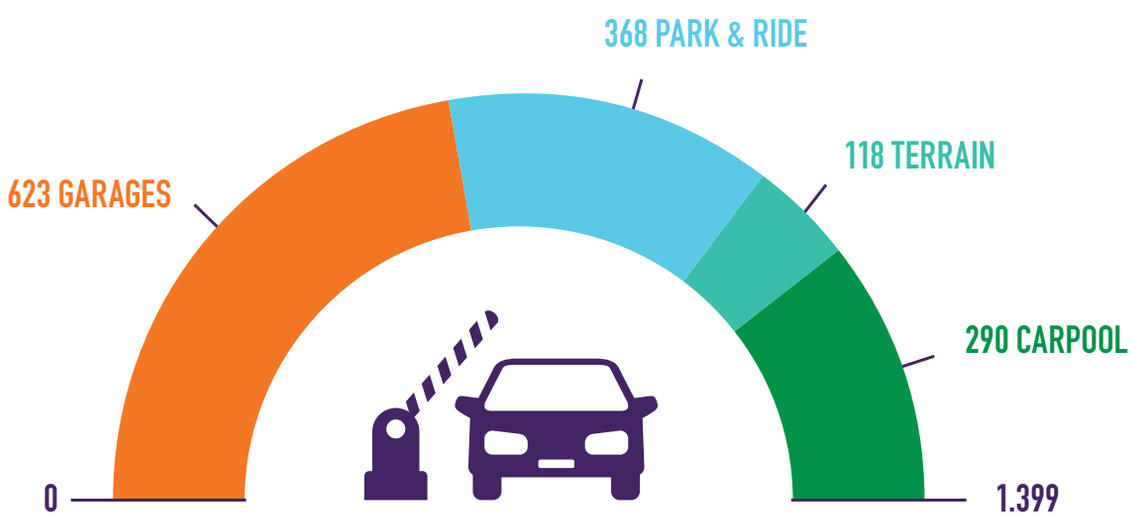
4.1.5 Real-time traffic information

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.

Since the previous progress report 2014-2017, the NAP now includes a dataset with real-time safety related information. The dataset includes information, amongst other things, regarding weather conditions, obstacles on the road and roadworks.

Dynamic information for travellers is also available on off-street parking locations. Dynamic parking data includes the number of available spaces. This information is available for 30% of the off-street parking garages and terrains. Additionally, it is available for 17% of the Park & Ride facilities (where an easy transfer from car to train/bus is facilitated).

Figure 6: amount of off-street parking facilities in the Netherlands[31]



31 Talking Traffic (2020) Dutch traffic and transport data, Current data, accessible in accordance with international standards, nationwide coverage

In addition, real-time traffic information is available for road users through various online applications and through DRIPs and graphic route information panels (GRIPs). A recent study into the use and usefulness showed that more and more people look for travel information pre-trip (51% in 2018 vs. 34% in 2015) and on-trip (46% in 2018 vs. 29% in 2015)[32]. The channels used are increasingly digital, the radio is losing ground and the smartphone is gaining. See also Figure 7.

Figure 7: use of road-related information services in the Netherlands

	2011	2015	2018
CHANNELS USED PRE-TRIP	(57%) - Internet on laptop/PC (39%) - Teletext (36%) - Radio (20%) - Internet on smartphone	(55%) - Internet route info (28%) - Internet congestion info (25%) - Route navigation (22%) - Radio	(52%) - Smartphone (30%) - Laptop/tablet (27%) - Desktop computer (26%) - Navigation system (25%) - Radio
CHANNELS USED ON-TRIP	(83%) - Radio (25%) - Electronic signs (24%) - Navigation with congestion info (23%) - RDS via radio	(46%) - Radio (39%) - Electronic signs (38%) - Route navigation (37%) - Blue signs (28%) - Navigation with congestion info	(43%) - Smartphone (36%) - Navigation system (35%) - Radio (32%) - Electronic signs (31%) - Blue signs
MOMENT OF CONSULTATION		(34%) - Pre-trip (29%) - On-trip	(51%) - Pre-trip (46%) - On-trip

Use of DRIPs and GRIPs

Dynamic travel information is provided in the Netherlands through DRIPs and GRIPs. Around 90% of the people in the Netherlands have encountered DRIPs on their travels. A little over 60% has seen GRIPs. 70% of people who have seen GRIPs find the information useful and use it regularly. For DRIPs this percentage is higher, around 85% . The majority of the people (around 90%) find the information on the panels on trustworthy.

4.1.6 Dynamic Travel Information

DOVA 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.

Data is made available to the public through various online applications which are privately developed, where departure times and travel routes can be found, updated instantly. For example, travel routes can be planned online. They are updated in real time, e.g. when there are public transport delays, alternative routes are instantly available. In addition, real-time departure times for all bus, tram, metro and train stations and stops in the Netherlands are available for anyone through online applications.

4.1.7 Freight Information

The NAP contains static information of parking space utilization of almost 330 truck parking spaces. In addition to general information such as names and coordinates, the database contains information about facilities

32 http://publicaties.minienm.nl/documenten/monitoring-wegverkeergerelateerde-informatiediensten-en-rijtaakondersteunende-systemen-2018

at the truck parking space (toilets, lighting, etc.). Some of the truck parking spaces already have real-time information about parking space utilization.
In 2019, most truck drivers in the Netherlands consulted road-related information services on a regular basis before departure[33]. Smart phone apps are most popular for this, those are used by 47% of the drivers. Of all truck drivers, 58% use a navigation system all the time. Traffic information that drivers often have available in their truck are the maximum speed (79%), lane information and lane signing (51%), and approaching a traffic jam (50%).

When looking at the advanced driver assistance systems (ADAS), the ones most available in the trucks are: standard cruise control (93%), hill assistant (66%), eco-driving system (60%), emergency braking (57%), lane departure warning (54%), ESC (52%) and forward collision warning (51%). Usually these systems are turned on, especially forward collision warning and standard and adaptive cruise control are used a lot. 60% of the truck drivers with an eco-driving system in their truck have it (almost) always turned on.

4.1.8 112 eCalls

The figure below shows the numbers of eCalls, distinguishing between automatically generated eCall calls and manual ones.

Figure 8: Information on eCall

112 BASED ECALL	NUMBER OF CALLS RECEIVED	NUMBER OF REAL EMERGENCY CASES
MANUAL	(2018) : 16 (2019) : 1470	(2018) : 0 (2019) : 312
AUTOMATIC	(2018) : 1 (2019) : 113	(2018) : 1 (2019) : 57
TOTAL	(2018) : 17 (2019) : 1583	(2018) : 1 (2019) : 369

This concerns the figures of the Pan European (PE) eCall, the eCall calls received at the national 112 control centre. No figures are known for the so-called Third Party Service (TPS), the private emergency centres.

The figures for 2018, from the start of PE eCall on April 1, as well as those for 2019 are included in the overview. This shows a clear increase in the number of calls.
The second column shows the number of calls that were forwarded after receipt at the national 112 control centre to an emergency service (fire brigade, ambulance or police) in a regional emergency control centre for further processing.

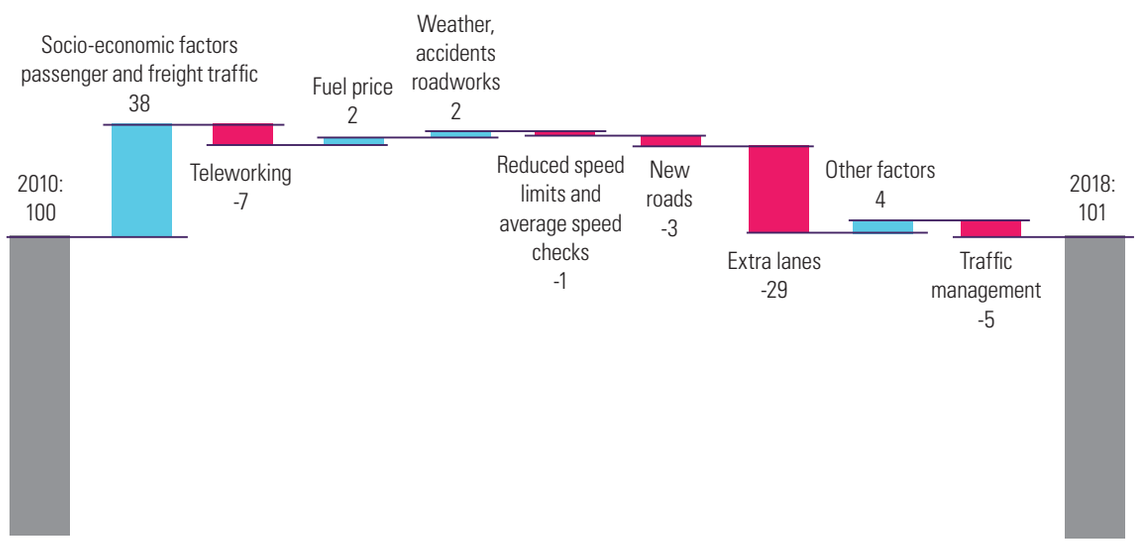
4.2 Effects

4.2.1 Change in travel time

Between 2010 and 2018 loss of travel time on the Dutch main road network has increased by 1%, while traffic itself increased considerable. Many different factors influence this 1% change. The figure below describes the different influencing factors and shows that traffic management contributes to a 5% reduction in lost travel time on a national basis. This category includes all traffic management and gives the average effect of all traffic management on main roads in the Netherlands, including non-ITS traffic management.

33 http://publicaties.minienm.nl/download-bijlage/113221/rapport-monitor-vracht-2019.pdf

Figure 8: growth in lost travel time: influencing factors[34]



The exact *national* effect on lost travel time of ITS measures was not possible to be determined. However, effects of different projects in the Netherlands have been collected, the results are described below, based on a publication by RWS[35]. It measures the effects of 210 different traffic management measures in the Netherlands.

It shows that ramp metering leads to an average decrease of loss of travel time of 10% (measured over 8 different locations). The range of effects is large: from -41% to + 3% change on the main road network.

Optimizing traffic control systems have led to an average decrease of loss of travel time of 27% , showing how important it is to update the traffic control systems regularly. However, describing the effect of updating traffic control systems is tricky, since the size of the effect depends on how long it has been since the last update. Using intelligent traffic control systems allows to perform updates continuously, so that benefits can be maximized. The Amsterdam Practical Trial reported an average decrease of loss of travel time of 2,3% , after connecting a ramp metering location, a bridge and 3 crossings together through an intelligent traffic control system.

Using DRIPs on four different locations led to decreasing the lost travel time between 13-69%. The results previously mentioned studies show that the effect of ITS technology differs greatly between locations and technologies, however they also show that ITS technology in the Netherlands has already had a positive impact on the loss of travel time.

4.2.2 Change in road accident resulting in death or injuries numbers

A publication of Rijkswaterstaat, collecting the effects of various traffic management measures shows that updating traffic control measures leads to positive effects on road safety[36]. This is especially true for incident/

34 https://www.kimnet.nl/mobiliteitsbeeld/mobiliteitsbeeld-2019#/

35 Henk Taale (2018) Effecten van benutting in Nederland. (effects of optimal use in the Netherlands). Available through: https://www.traffic-quest.nl/images/stories/documents/Evaluatie/effecten_benutting_v4.0.pdf

36 Henk Taale (2018) Effecten van benutting in Nederland. (effects of optimal use in the Netherlands). Available through: https://www.traffic-quest.nl/images/stories/documents/Evaluatie/effecten_benutting_v4.0.pdf

congestion warning panels that have resulted in an average 19% decrease in accidents (ranging from 15-45%) and another decrease of 35% of secondary accidents (caused by the congestion or incident). Extra lanes have also had a positive effect on safety: road capacity can be increased smartly by offering more lanes on the same road, this can be done either by making each existing lane narrower to make room for more, or by using a dynamic system where more lanes are made available when demand is high. These measures have had a (mostly) positive effect on road safety: the risk of accidents has decreased on average from 0,070 accidents to 0,029 accidents per 1 million kilometres driven on these stretches, a decrease of almost 60%. The effect of other measures like ramp metering, optimizing traffic control systems and using DRIP's has not been quantified.

4.2.3 Change in traffic- CO2 emissions

As was described in paragraph 4.2.1, many of the ITS measures the Netherlands has taken have led to a decrease of the loss of travel time. The better circulation has definitely decreased the CO2-emissions per car kilometre (compared with a situation that these measures would not have been taken). However, these reductions have rarely been quantified. The effects of ramp metering and optimizing traffic control systems have incidentally been measured, the effect of these measures range on CO2-emissions from -4% to +1%.

Other quantification of CO2 effects includes six intelligent traffic lights that were placed on the N279 in the south of the Netherlands, which give heavy freight-trucks priority. This has led to a 2% decrease in CO2-emissions[37]. This is due to that heavy trucks enjoying priority at traffic lights stop less frequently, which reduces CO2 emissions.
Lastly, measurements in Deventer showed an improvement of 7-15% in emissions.

In all, the bandwidth of effects is large and is strongly determined by local, changing conditions and times. The effects can therefore only be established with reliability over a much longer period (1-2 years).

4.3 Financial KPIs

In 2019, Rijkswaterstaat has spent €255 million on traffic management on the motorways in the Netherlands, a moderate increase over the previous years. This amount includes spending on regular traffic management (road Inspectors, Traffic Controllers TMC's; €62 million), operating and maintenance of roadside equipment for dynamic traffic management (VMS, camera's etc. € 104 million). The €255 million are spent by the Dutch state (Rijkswaterstaat).

In addition, regional and local authorities are responsible for maintaining and implementing traffic management on the local roads.

In the period 2017-2020 these regional and local authorities have invested in, amongst other things, the projects Optimizing Use and Talking Traffic for a total of €70 million. An important part of this investment regards traffic management systems (iVRI's).

For example, the province of North Holland invests yearly more than €2 million on new traffic management systems (iVRI's), data and pilot projects on their provincial roads. This is expected to increase slightly the coming years[38]. Note that on top of that the province maintains and operates the existing ITS and traffic management systems. The costs of these are unknown, as they are incorporated in larger maintenance contracts. The same goes for the other provinces and the bigger cities. They are also expected to increase their investment (and, hence, the operating and maintenance costs) in ITS systems and data.

37 https://www.traffic-quest.nl/images/stories/documents/Jaarbericht/verkeer_in_nederland_2019.pdf
38 Interview Province of North Holland

5 Closing Remarks

5.1 General

Since decades the Netherlands has implemented ITS at large scale. Starting in the 1980s, the Netherlands invested billions of euros in Traffic Management and Information. Because of our dense, intensively used networks, only this way we are able to cope with growing mobility demand, traffic safety, and environmental issues. The last decade new forms of ITS, smart mobility, have been emerging with the promise of providing effective solutions and extra space to manoeuvre. Next to keeping mobility 24/7 operational, world-wide changes require new focus and new solutions, and offer the potential to address them e.g. climate change, resilience of networks, the society-wide digital world etc.

At the national level, together with local authorities and private sector, and in cooperation with the EC, UNECE, standardisation organisations and other international partners, the Netherlands seriously invests in the development and implementation of the new areas of smart mobility. Such as C-ITS, automated mobility, MaaS, and unlocking the potential of digital data sources and information, for which EC delegated acts under the ITS Directive have provided the legal foundation. In the Netherlands the accent in this process shifted during the report period from R&D and pilots towards implementation, hence 'Smart Mobility, Dutch Reality' (see ministerial letter in paragraph 1.2).

5.2 Specific Questions and Wishes Addressed to the European Commission

Points of attention with regards to ITS:

- The Netherlands welcome the PSA for the Harmonization of NAPs and National Bodies. It is evident that some of the elements of the ITS directive should be addressed jointly such as the enforcement of priority action C, a common ledger/registry so industry players have a one-stop shop and additional communication effort for all parties on the possibilities and obligations;
- European tools, which are important for today's actual cross-border and cross-corridor co-operation, such as e.g. DATEX, are being properly kept alive and evolving, and that European profiles for other standards are developed;
- For the newer smart mobility solutions European/international cooperation will be of importance for both the sharing of knowledge, agreeing European/international solutions and finding ways for efficient implementations to realise the single multimodal European Transport Area.

5.3 What is the Netherlands Committed to in the Coming Years?

Level-up ADAS

As was mentioned in the first chapter, in 2019 the Dutch Safety Board ('Onderzoeksraad voor de Veiligheid') published a report on the impact of Advanced Driver Assistance Systems (ADAS) on traffic safety. The report 'Who is in control? Road safety and automation in road traffic' states that it is often unclear to the driver to what extent the vehicle takes over the driving task, and therefore he is not always able to estimate what is still expected of him and how he should act when necessary. This leads to new safety risks in traffic, which we should address adequately on Dutch, European and UN level. Within the regulatory landscape we should not only envision the future of automated driving, but from a human factor perspective look at current systems as well. The Netherlands would like to see more focus on the driving skills of the system, rather than mere technical demands.

Digitalization

Digitalization is a key element in achieving our policy goals (a cleaner, safer, and integrated multimodal mobility system). With the use of data, we maximize the effectiveness of existing infrastructure and governance,

thereby achieving more with resources invested in mobility. Dutch governmental bodies have come to a set of agreements to advance digitalization:

- By integrating data-use as an essential tool for policy decisions and monitoring, informing the traveller, and improving governmental efficiency;
- The various data access points NDW, DOVA, RDW, Statistics Netherlands (CBS) and the National Signage Service ('Nationale Bewegwijzeringsdienst', NBd) will continue to develop the NAP in the coming years to disclose the available mobility data in and make it usable;
- In addition, more road data concerning traffic rules, road layout and road status will be made available by Dutch governments in standard formats.

Deploying services

Connected mobility has rightfully been a hot topic over the last years or even decade. The potential for great societal benefit is clear and commercial interests are high, leading to often-heated debates about technology choices and deployment options. In general, all vehicular, traffic & service technologies that can contribute to public authorities' policy goals are very much welcomed, without prejudice or preference. This means that from a wireless technology perspective, we are neutral towards the adoption of the different wireless technologies that could be used for the realisation of connected mobility solutions. For our own infrastructure investments, it is recognized that due to the specific conditions of our country and the development in cellular technology, the added value of direct short range communication seems limited and a niche for the Netherlands considering the continuous development in ADAS and the sensor suite of modern vehicles. We do, however, greatly appreciate the progress made in terms of standardization and profiling of messages, architectures and the framework.

We will therefore continue to determine what services have the highest societal value and are committed to bring these services to road users, via the various cooperation platforms such as CCAM Partnership, Data Task Force and others. Our research and developments will be focused on exploring new technologies such as the 5G Blueprint project.


112
E-CALL
SPEED CHECK
LOAD VEHICLE
FIRE
TRUCK
TURN
RIGHT
POLICE

Appendix

A. Abbreviations

ADAS	Advanced Driver Assistance Systems
AID	Automated Incident Detection
B2B	Business to business
CCAM	Cooperative Connected Automated Mobility
CCTV	Closed-circuit television
CBR	Central Bureau of Driving Licenses
CEDR	Conference of European Directors of Roads
CEF	Connecting Europe Facility
CNC	Core Network Corridors
Concorda	Connected Corridor for Driving Automation
DOVA	Collaboration of Decentralized Public Transport Authorities
DRIP's	Dynamic Route Information Panels
EC	European Commission
EIP	European ITS Platform
EU	European Union
EuroNCAP	European New Car Assessment Programme
GPS	Global Positioning System
GRIP's	Graphic Route Information Panels
IDACS	ID and Data Collection for Sustainable fuels in Europe
ITS	Intelligent Transport Systems
MSD	Minimum set of data
NAP	National Access Point ITS
ND-OV	National Data Warehouse for Public Transport (Nationale Databank OV-gegevens)
NDW	National Traffic Data Warehouse (Nationale Databank Wegverkeergegevens)
NeTEx	Network Timetable Exchange
OEM	Original Equipment Manufacturer
NLIP	Neutral Logistics Information Platform (Neutraal Logistiek Informatie Platform)
PKI	Public Key Infrastructure
PSA	Program Support Action
RDW	National Vehicle and Driving Licence Registration Authority (Dienst Wegverkeer)
RSU	Roadside units
RWS	Directorate-General for Public Works and Water Management (Rijkswaterstaat)
SOCRATES	System Of Coordinated Roadside and Automotive services for Traffic Efficiency en Safety
SRTI	Safety Related Traffic Information
TIS	Travel Information System
VMS	Variable Message Sign

B. Overview of ITS projects in The Netherlands

ACTIVITY	KIND	EU FUNDING	STATUS	PROGRESS AND ACTIVITIES ORGANISED BY THE NETHERLANDS
Priority Area 1: Optimal use of road, traffic and travel data				
CHARM	Project	Yes	In progress	The Dutch Road Authority (Rijkswaterstaat) is going from about 30 separate traffic management systems to one nationally uniform platform: CHARM. CHARM provides better support and traffic incident management in all traffic centres and simpler tasks are automated - giving more time to authorities to handle incidents. In addition, uniformity makes linking with partner systems easier, so innovation and collaboration is improved. Private parties have been asked to develop prototypes for innovative modules for the platform in the areas of: incident detection, network management and in-car systems. Six pilot modules have now been completed (not yet on the market) and have proven to work with the new platform.
DATA TOP-15	Project	Yes	In progress	For decentralized authorities it is a challenge to fill datasets, just like national governments do. Often they do not have the organizational strength to make this transparent and to provide the necessary data. This makes it complex to get the data uniform. For this reason, a prioritization of datasets has been made (the DATA TOP). In the past couple of years, 7 datasets have been added to the priority list. There is now a Data Top 15.
DATEX II	Platform	Yes	Current	On the 23rd and 24th of May in 2018 the 5th DATEX II Forum was held in the LEF Future Meeting Center in Utrecht, the Netherlands (the last held DATEX event). 143 participants from 20 different countries came together to learn more about the standard, to exchange knowledge with the rest of the community and to enter into discussions about the future. The Forum ended with the "Declaration of Utrecht": a non-binding guidance document for the future of DATEX II. The Declaration of Utrecht contains the concluding statements of the Forum and shows how DATEX II can further develop in the coming years with regard to topics such as information exchange, stakeholders and outreach, open data and user support.
IDACS	Project	Yes	In progress	IDACS stands for "ID and Data Collection for Sustainable fuels in Europe" and entails data collection related to recharging/refuelling points for alternative fuels and the unique identification codes related to e-Mobility actors. In the Netherlands there is already a system of code generation in place. Shortly after the start of the project other countries have started to collect on charging stations from charging infrastructure operators.

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Internationale Automated Transport (I-AT)	Project	Yes	Completed	The Interreg project 'Interregional Automated Transport' (I-AT) started in 2017 to develop and enhance innovations in self-driving transport for the mobility and logistics sectors in the Dutch provinces Gelderland, Noord-Brabant and Limburg and the German region Nordrhein-Westfalen. Specifically, the project has led to the development of a pilot project with self-driving shuttles at Weeze Airport; the integration of autonomous driving into the automotive engineering course of the Technova College in Ede; a number of practical studies into the preconditions for autonomous driving and truck platooning; and the development of a new, autonomous driving bus, the Mission, which underwent an extensive test program on the test circuit in Aldenhoven (near Aachen).
NDW Floating Car Data	Pilot	No	Remains current	From early 2017, NDW has received national floating-car data from Be-Mobile. Since February 2018, NDW has been receiving average travel times and speeds across segments for the entire road network every minute. The data was initially purchased for applications in the field of traffic management. NDW is constantly examining the quality of the data and whether it can be used in other application areas as well.
Nissan Traffic Signal Trial	Pilot	No	Completed	"A collaboration started with the Nissan Research&Development Center in Sunnyvale, California in 2013. This collaboration has led to the development of a self-learning algorithm that predicts the status of the traffic light, thus providing autonomous vehicles with real-time information. Other outcomes of this pilot provide answers to the many questions on traffic flow, communication between traffic lights and cars (direct through WiFi-P or through the cloud), sharing information between autonomous cars and traffic control centers, providing in-car advice, and so on. A learned lesson is that there has to be a mutual question and a mutual interest to start a pilot. All involved parties want to invest in the pilot and are willing to sign a non-disclosure agreement if one of the parties feels it is necessary to do so.
Partnership Talking Traffic	Project	Yes	In progress	This joint co-investment program seeks to enhance the availability of intelligent data for a wide group of road users. In October 2018 the Experience Week Connected was organised. During this week, approximately 250 trucks driving in a convoy were operationalized and fully integrated into logistics retail, container and flower transport chains. The focus was on the smart exchange of data between traffic management and logistics. A lot of knowledge and experience has recently been gained within Talking Traffic.
Seven Nation-Wide MaaS-Pilots	Pilots	No	In progress	The Ministry of Infrastructure and Water Management has worked together with seven regions to develop seven nationally scalable MaaS pilot projects. In 2018, the Ministry tendered a framework agreement and selected 24 consortia. These consist of parties that are already actively involved in mobility sharing or with MaaS in some way. The pilot projects are carried out from 2019 onwards until the end of 2021. Results are expected once the pilots are completed.

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SimSmartMobility	Platform	No	In progress	25 public and private partners signed a letter of intent, confirming their partnership SimSmartMobility. More parties are expected to join and contribute to the development of knowledge and insight into smart mobility services and products on traffic flow, accessibility, safety and the environment. Insight is gained by simulation enables all interested parties to learn faster and more about the effects of Smart Mobility services and solutions. The development of the simulation platform is iterative, adding more functionality each time.
Smart Mobility Community for Standards & Practices	Platform	No	No longer current	In the Smart Mobility Community for Standards & Practices professionals working at public parties, private organisations and knowledge/scientifical institutions make an effort to place, prioritize and answer joint preconditions for the use of smart mobility. The outcomes (products, agreements, standards, choices) of the work agenda are returned to the Community of stakeholders.
TN-ITS	Project	Yes	In progress	TNT-ITS supports member states by providing guidelines, tools and services the exchange of information on changes in static road attributes. In addition, the platforms work on standardisation by defining and maintaining the TN-ITS specification CEN/TC 278 /WG7. The Netherlands has two members of the TN-ITS platform, both are map makers; TomTom and Here.
Use of Information Services During Roadworks (schiphol-amsterdam-almere)	Pilot	No	Completed	"The Schiphol-Amsterdam-Almere (SAA) program has completed a series of pilot trials to determine the effect of the push notifications on traffic levels (compliance behaviour). Experience at SAA has shown that the measure works best for disruptions on the main road network and in busy areas operated by municipal or provincial road managers. The most important question to be asked before using push notifications is whether it is possible to reach large target groups."
Priority Area 2: Continuity of traffic and freight management ITS services				
Accessible Amsterdam Feasibility Study	Research	No	Completed	It has been investigated which components have proven themselves sufficiently to contribute to the accessibility of the Amsterdam region and beyond, as well as which preconditions there are for a successful application. The results show that two design solutions - "scheme for the main road network" ('regeling kiem hoofdwegennet') and "scheme for the urban road network" ('regeling kiem stedelijk wegennet') - are mature enough to be able to apply directly to better direct and direct traffic. For the new and better services to facilitate road users ("smart travel") it has been concluded that there are three design solutions from which to choose. By creating design solutions and formulating preconditions for a successful application, the project team hopes to translate it into applications outside the Amsterdam region easily.
Amsterdam Practical Trial, COP	Web application	No	In progress	The Common Operational Picture (COP) has been developed using open architecture and open interfaces. This makes it possible to add public and private FCD information. With this feature, all public and private traffic centres in the Netherlands and abroad can implement COP. It is currently being offered as a service by Amsterdam Practical Trial partners from the private sector.

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Blue Wave for Waterways	Platform	No	In progress	Blue Wave for Waterways started off as a project with different public parties. The project has resulted in a free accessible platform with real-time information about open bridges. The available berths in the ports of Amsterdam and Rotterdam are also shown, as well as the berths managed by North Sea Port and Rijkswaterstaat. As part of the Blue Wave for Waterways, in addition to bridge and berth information, lock information has also been shown since August 2018. The number of locks shown will be expanded in the future.
Electronic Cosignment Note	Protocol	Yes	Completed	e-CMR officially launched in January 2017 with the first ever border-crossing to use electronic consignment notes. In 2020 the Transport Ministers of the Netherlands, Belgium and Luxembourg are calling on truck drivers and carriers to use e-CMR (also in relation with the spread of the COVID-19). The Netherlands and Luxembourg have already ratified the e-CMR Additional Protocol. In 2019 a pilot project regarding France, the Netherlands and the United Kingdom involved Transport FIOLET (transport company). It marked the use of e-CMR, with the first ever border-crossing with multiple countries on mainland Europe, using the electronic consignment notes on this route. The Benelux countries started joint e-CMR tests in 2018. Besides, in the same year two Dutch companies (Trimble and BAS Transport) performed a pilot together.
iCentrale	Project	No	Completed	Market parties have developed solutions for efficient and effective urban and road management together with local and nation-wide governments. These iServices have come available nationwide, decentralized governments can purchase mobility, security and smart power stations as a service. The iCentrale program started as a public-private partnership between local governments and market parties. Due to the start of the first national tender, the private parties have no longer been associated with the national iCentrale program since the spring of 2019.
iShare	Appointment system	No	In progress	Since 2017, everyone can share data with everyone in the logistics sector using the iSHARE Appointments System - also with previously unknown parties. In a simple and controlled way.
I-WKS (part of EIP/ Ursa Major)	Project	Yes	In progress	On 16 July 2018 the first 8 intelligent roadside units (RSU) were installed on the A9 motorway near Alkmaar, the Netherlands. Since 2017, Rijkswaterstaat has been working on RSU's. With intelligent RSU's, GPS information from cars can be used to calculate and monitor traffic. In the long run, road users can a receive information on the current traffic situation on their navigation system, or the RSU's simply communicate directly with self-driving vehicles.
Neutral Logistic Information Platform (NLIP)	Platform	No	No longer current	NLIP facilitates the development of tools - digital standards, agreements and contracts - and the opening up of data sources and the establishment of new partnerships.
Smart Shipping	Policy rule	No	Applicable	As of October 2018, the Policy Rule on Experiments on Automated Shipping on National Waterways will apply. This policy rule makes it easier to request permission to experiment with automated applications on national waterways.

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The European ITS Platform (EU-EIP) and ITS corridors	Imple-mentation Program	Yes	In progress	The national road operator Rijkswaterstaat, with other partners in the Netherlands is a very active participant in the CEF-ITS imple-mentation program, covering EU-EIP and so-called ITS corridors, which cater for seamless, harmonized services along European corridors. In the ITS corridors Ursa Major and Arc Atlantique implementation projects of harmonized ITS are contributing to the digitalization of the TEN-T Core Network Corridors, CNC, and wider networks. In the past three years, several results have been achieved at EIP, Art Atlantique, Ursa Major (see paragraph 3.2.1 of the National Progress Report 2017-2020).
Priority Area 3: ITS road safety and security applications				
Flister (part of Ursa Major, EIP)	Project	Yes	Completed	Since 2018 drivers of salvage vehicles in the Netherlands can send electronic safety warnings to road users. When they are working on the road, they can use an app on their smart phone to send a message, which is then forwarded to the road users. The pilot led to a national contract for Flister with the Association of Incident Management Netherlands (SIMN), a cooperation of the Dutch alarm centres with activities in the field of salvage of pas-senger cars. This contract now gives the possibility to all salvage companies member of SIMN to send these safety warning messa-ges. The Flister service is free of charge available for all member companies of SIMN. Flister is also used in the Netherlands for ambulances and road inspectors of Rijkswaterstaat.
Pilot Tyre Pressure System A16	Pilot	Yes	In progress	Rijkswaterstaat has installed a tyre pressure measuring system for a one-year pilot on the A16 motorway, south of Rotterdam. With this pilot a public-private partnership (called the Verkeerson-derneming) between the municipality of Rotterdam, the Ministry of Infrastructure and Water Management, Rijkswaterstaat, the region Rotterdam-The Hague and the Port of Rotterdam collabo-rates with Rijkswaterstaat in order to detect truck tyres which are punctured and/or have low pressure in an early stage. Currently, Phase 3 is carried out. There are now 201 participants with a total of 39.765 license plates.
MobilitymoveZ.NL (part of SmartwayZ)	Projects in Public Private Partner-ships	No	In progress	Three projects were carried out in the MobilitymoveZ.NL test environment and are completed. Four projects are in progress. The car industry, road authorities and developers of technology and services participate in these projects. Knowledge questions in the field of autonomous driving, asset management with information from vehicles, application of driving task supportive technology in cars, communication with traffic lights and digitization of traffic management are answered in this way.
SmartWayz.NL	Program-me	No	In progress	The SmartwayZ.NL mobility programme consists of eight related sub-projects in the Dutch provincies North-Brabant and Limburg. The programme supports companies who want to test, improve and roll-out smart mobility solutions on a larger scale. Various projects run under the Smart Mobility sub-project. In the past three years several results have been achieved at the different projects. For more results see paragraph 3.4.2 of the National Progress Report 2017-2020 and https://www.smartwayz.nl/en/smart-mobility/.

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Priority Area 4: Linking the vehicle with the transport infrastructure				
Amsterdam Practical Trial (APT) South-East	Project	No	Completed	In the past three years the project has prepared for Phase 3: Consolidation projects: these apply the consolidation of the previously successfully tested APT-components such as Amsterdam Bereikbaar (Amsterdam Accessible) whose objective is to attain maximum accessibility for the Metropolitan Region of Amsterdam (MRA). Innovation projects: these focus on the further integration of the roadside and in-car systems. It involves tests that connect vehicles and operational traffic management with real-time travel, route and navigation advice. Service providers and road managers will collaborate in these projects. This part continued in Socrates 2.0 since 2018 (see below and paragraph 3.5.1 of the National Progress Report 2017-2020).
C-ITS Corridor (part of Intercor)	Project	Yes	In progress	March 2019, twelve teams from InterCor Member States France, Belgium, the United Kingdom and the Netherlands participated in the InterCor Cross-border Interoperability TestFest. The Dutch C-ITS Corridor project team was one of the participating teams and performed a large number of test runs in all countries involved. On October 2, 2018, a convoy of trucks from the Experience Week Connected Transport successfully tested the Road Works Warning service on the hybrid pre-deployment test site of the C-ITS Corridor and InterCor projects.
Concorda	Project	Yes	In progress	Concorda's priority is to analyse the interoperability of technologies enabling vehicle-to-everything (V2X) communication under real traffic conditions. With the aim to prepare the European motorways for automated driving and high-density truck platooning. Concorda will conduct tests at sites in five different countries, of which The Netherlands. The project was launched in 2017, since then several workshops have been organised (see also paragraph 3.5.1 of the National Progress Report 2017-2020).
FLO	Project	No	Completed	Flo is a bollard in front of the bicycle traffic light that gives personal speed advice to get the green light. Most cyclists experience FLO as positive and understand the idea behind it and the symbols well. Cyclists know better where they stand, they experience less crowdedness. Besides they like the symbols and that they often get the green light. Research has shown that during rush hour the traffic light is less predictable by FLO.

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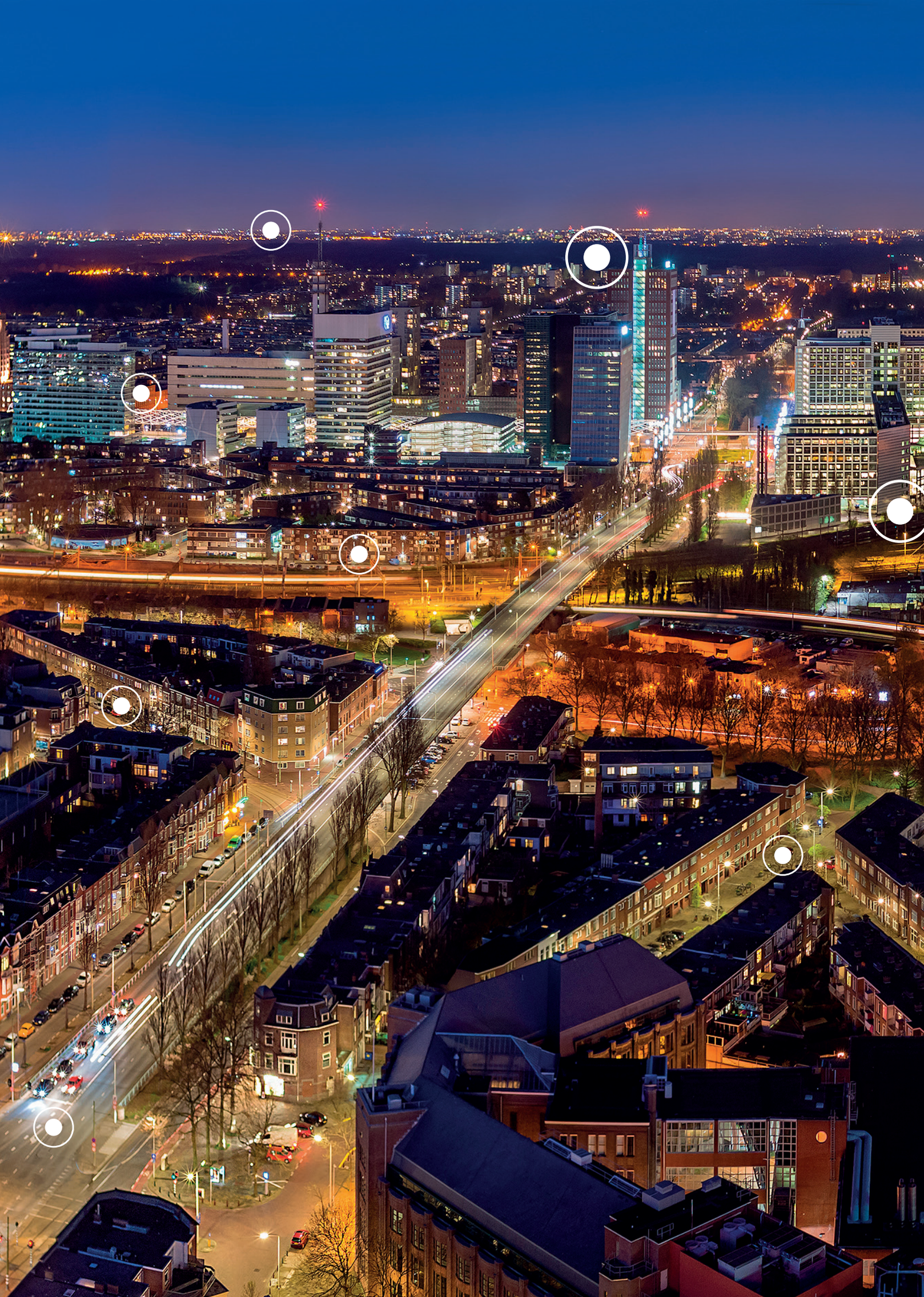
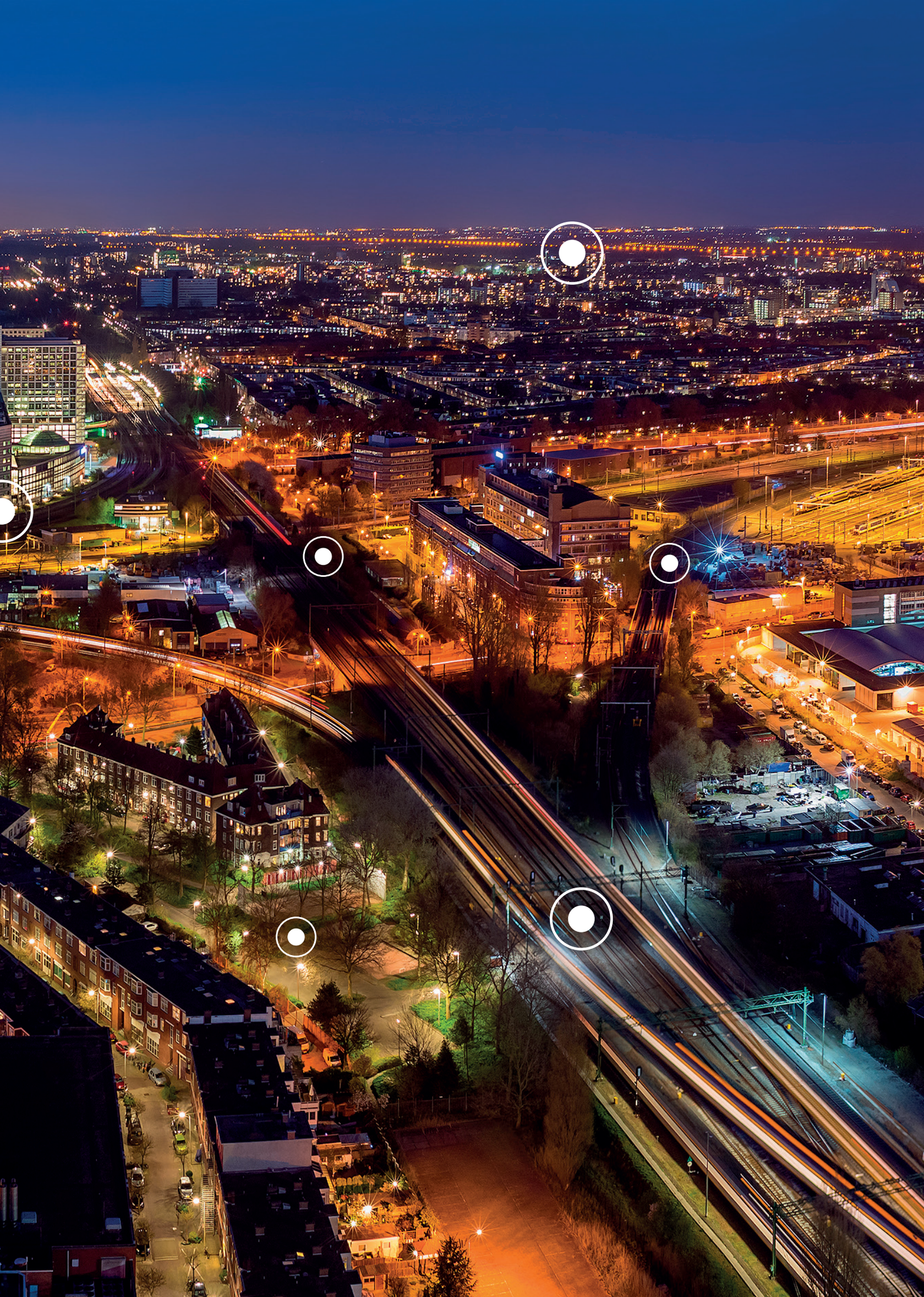
Intercor	Project	Yes	In progress	The project aims to enable vehicles and related road infrastructure to communicate data through cellular, ITS G5 or a combination of both networks on road corridors through the Netherlands, Belgium, the United Kingdom and France. This year, the main report of the pilot evaluations was published, for the results please visit https://intercor-project.eu/library/#. In 2019 the 13th European ITS Congress took place from 3 to 6 June 2019 in Eindhoven's Evoluon centre with various demonstrations and side events in the neighbour ITS pioneer city of Helmond. Main result of 2018 is that, in principal, the overall C-ITS concept functions and allows for cross-border interoperability. This holds true for both ITS-G5, including the Public Key Infrastructure (PKI), and cellular communication. Although the interoperability testing was positive, there were still details in interpretation of specifications and differences in implementations preventing systems from working together properly.
Socrates 2.0	Project	Yes	In progress	SOCRATES 2.0 aims at introducing traffic management in traffic information and navigation services anticipating the integration of these services in self-driving cars. In preparation for the actual pilots, a framework on the cooperation has been delivered in July 2018. In September of the same year most of the work on pilot designs was finalised. By the end of 2019 almost all pilot sites are up- and running, he evaluation of the pilots isplanned for the end of 2020 (see also paragraph 3.5.1).





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