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1 Introduction

This report has been drawn up within the framework of the European ITS Directive (2010/40/EU), amended by Directive (EU) 2023/2661, under which Member States are required to submit a report every three years, covering the implementation of the Directive and of all delegated and implementing acts. This is the first report issued under the amended directive, with a different template than previous reports. While the frequency of reporting is kept equal (every three years), this first report under the amended ITS directive only covers a period of one and a half years, from the 1st of July 2023 to 31st of December 2024. The previous report was submitted to the European Commission (EC) in 2023 and covered the period 2020-2023.

In this report, the Ministry of Infrastructure and Water Management (the Ministry) gives an overview of progress made on the deployment of Intelligent Transport Systems (ITS) in the Netherlands, including Key Performance Indicators (KPIs). Also, the report gives an overview of ITS in the Netherlands at large and describes the progress made regarding the implementation of the ITS related Delegated Acts:

- Delegated Regulation (EU) 2017/1926 on the provision of EU-wide multimodal travel information services;
- Delegated Regulation (EU) 2022/670 on the provision of EU-wide real-time traffic information services;
- Delegated Regulation (EU) No 886/2013 on data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users;
- Delegated regulation (EU) No 305/2013 on the harmonised provision for an interoperable EU-wide eCall;
- Delegated Regulation (EU) No 885/2013 on the provision of information services for safe and secure parking places for trucks and commercial vehicles.

To provide good insight into the progress made in the area of ITS in the Netherlands, the report mainly focuses on the projects, services and activities that have been undertaken, or completed in the 2023-2024 period. It is worth mentioning that the list of activities and projects mentioned in this report is not exhaustive. 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, the focus lies on presenting facts, figures and images. This report is the result of a close collaboration between MAPtm, NTM, the Ministry of Infrastructure and Water Management and Rijkswaterstaat.

1.1 Document structure

Chapter 1 describes the general overview of the national activities and the general progress since 2023.

Chapter 2 describes the progress made in implementing the projects, activities and initiatives under each of the four priority areas:

- Priority area 1: Information and mobility ITS services.
- Priority area 2: Travel, transport and traffic management ITS services.
- Priority area 3: Road safety and security ITS services.
- Priority area 4: ITS services for cooperative, connected and automated mobility.

Additionally, this chapter addresses the accessibility and availability of data types specified in Annex III of Directive 2010/40/EU through the NAP. Finally, it also reports on the availability of services outlined in Annex IV of Directive 2010/40/EU.

Chapter 3 describes the impact of projects, activities and initiatives on the requested KPIs.

Appendix 1 gives a list of all abbreviations used in the report.

1.2 General progress since 2023

In the period since the last report in 2023, significant progress has been made in developing and implementing Smart Mobility and Intelligent Transport Systems (ITS) services. These developments have advanced the Ministry's long-term vision for smart mobility in the Netherlands and are closely aligned with the goals and objectives of the EU ITS Directive and the common European specifications under this directive.

Since the publication of the revised ITS Directive, the Netherlands has been diligently working on its implementation in collaboration with the relevant stakeholders. The Ministry has performed a dedicated impact analysis for the ITS Directive on the Netherlands. The primary objectives were to identify the gaps that need to be addressed to ensure compliance with the Directive and to determine how the Directive can assist the Netherlands in achieving its mobility data ambitions. Additionally, the Ministry is currently engaged in the transposition of the ITS Directive into national law. Furthermore, a remaining facet of the Directive's implementation is compliance assessment, for which the Ministry is currently exploring the most effective organisational approach.

Progress related to governance and access to mobility data
Several activities have been undertaken to improve both governance and access to mobility data. A key achievement has been the development and launch of the Digital System for Mobility Data (DSM). Based on the collaboration between the Ministry, national, regional and local governments, the National Access Point for Mobility Data (NTM), and other mobility data organisations. The aim of DSM is to establish a sound governance and agreed principles for mobility data availability, usability, findability and exchange. Thereby enabling the development and structural guarantee of public and private mobility applications. DSM also includes jointly established service quality and exchange standards, aligned with related EU requirements for accessibility of data. DSM also defines and establishes the further development of multiple interconnected data platforms and hubs, along with their standards and governance, as briefly described below.

The National Road Traffic Data Portal (NDW) has further developed and deployed new tools and services to assist governments and road authorities in creating and managing road and traffic data elements. These services, developed as part of the Rijkswaterstaat VM-IVRA programme, also enable authorities to publish data via the National Access Point (hosted by the NTM) in compliance with the amended DR EU RTTI requirements. Enhancements to the NTM service, which facilitates mobility data accessibility and exchange across existing data hubs, include new search and findability features. These improvements align with the NAPCORE harmonisation and interoperability activities outcomes, in which NTM actively participates.

Currently, two new data portals are under development for electric vehicle charging infrastructure and shared mobility. The data portal for charging infrastructure is currently under development after finalising an efficient design that meets the main objectives and other requirements. The portal is expected to be ready for receiving and publishing data in 2025. Alongside development of the data portal, data is being acquired in cooperation with the charge point operators. It is expected that further development and standardisation will be needed to improve data quality and accessibility. Furthermore, the data portal for shared mobility is developed under the collaborative programme Shared Mobility. Work on the data hub is in the exploration phase, with various options being assessed. In 2024, the structure of the data chains was evaluated and the responsibilities this will impose on organisations were identified. Furthermore, a first version of the Dutch Profile for shared mobility data for shared two-wheelers and cars was developed.

At the end of 2024, work started on improving nationwide data access for mobility hubs. A lack of (reliable) data resulted in challenges when including hubs in MaaS and trip planning services. The national programme for mobility hubs is investigating possibilities of expanding the existing Central Stop Database (CHB), which includes all public transport stops, with static and dynamic data on mobility hubs. The project includes an investigation into how the MMTIS requirements can be met during the further development of this national database.

NTM is working on a Standards Overview, which will serve as a central platform for all international mobility exchange standards used in the Netherlands. The overview consolidates metadata of standards, management organisations, and concrete data publications, making it an essential link in the Dutch mobility data ecosystem. Additionally, the standards overview establishes connections with national and international management organisations that are responsible for the maintenance and development of the standards. This gives users of the NAP insight into their governance, development and management processes, as well as possibilities for participation. The standards overview will be directly matched with the data register (NAP), which informs users about which standards are used, how they are used in practice and which organisations have experience with the standards. These developments will lead to better findability and usability of standards, as well as increase transparency, efficiency and interoperability.

Because the data standards governance for mobility is currently managed in various unaffiliated organisations, in 2024, the management organisation of mobility standards was founded. The goal of its creation was to manage standards within a single organisation, leading to centralised access and expertise, as well as a common roadmap and sustainable interoperability. The collaboration aims to bring three management organisations into a single Strategic Committee (SC):

- BISON, which focuses on the standardisation of public transport information;
- Technical MaaS standards that enable seamless travel for end users;
- MOGIN (Mobility Data Governance in the Netherlands).

On December the 16th of 2024, the SCs of MaaS and BISON were merged into the SC Multimodal Travel. The goal of the SC is to create the right conditions for the further development of multimodal travel through good and usable standards. Promoting interoperability, as well as encouraging the collaboration of various public and private parties. To further enhance collaboration, the SC MOGIN will also be added to the SC Multimodal Travel.
Besides progress on availability and accessibility of data, remarkable progress was made on the exploitation of data for various services.

In order to harmonise and facilitate data sharing in the mobility, transport and logistics sectors with a multimodal perspective, the Netherlands took on a coordinating role in the initiative to form a European Digital Infrastructure Consortium (EDIC) in collaboration with EU member states. The objective of the EDIC is to aim for standardisation of the technical specifications for data sharing in the European Mobility Data Space. To enable this, the EDIC will support and initiate cross-border projects that all use the same technical specifications. The expectation is that the EDIC can start in the first half of 2025.

Progress related to implementation of ITS services
The Netherlands has made significant efforts to advance the use of data for ITS services. Significant progress has been made in the transition to the NeTEx interface, used for sharing static public transport information. Furthermore, the geometry/map layout structures of all train stations are provided as test data, including locations of lifts, escalators, entrances and exits, leading to better accessibility of these stations. Additionally, real-time information on public transport was extended with information on flexible public transport, as well as vehicle information, such as emission characteristics.

The Rijkswaterstaat VM-IVRA programme has completed its proof-of-concept phase and is now deploying traffic management information services by integrating them into service providers' traffic information and navigation platforms. This transition to providing public information via in-

vehicle service providers leverages both their local context-aware capabilities and extensive geographical coverage, as well as the growing shift in road users' reliance on digital navigation services for routing information rather than traditional roadside systems.

Significant advances have been made in leveraging vehicle data to improve road traffic management and information services. Within the Road Monitor (ROMO) project, collaboration between automotive service providers and road operators focused on exploring the technical and functional possibilities of probe vehicle data to improve insights into road safety, asset and weather management. Based on these results, a new ROMO initiative has been launched to expand vehicle data collection and further enhance road operator services.

Progress in implementing ITS services was also achieved through the successful completion of the Safety Priority Service (SPS) initiative, in which several service providers integrated and delivered public sourced road safety-related information to road users via in-car services. Implemented services include, among others, traffic jam tail warnings and emergency services warnings. As part of SPS, initial experiments were conducted on a feedback loop concept, aiming to improve the quality of road authorities' information through system or user input, along with initial insights into defining an electronic data exchange for RTTI data feedback.

In April 2024, the Ministry of Infrastructure and Water Management signed a covenant with Hyundai Motor Group, the parent company of Hyundai and Kia. The covenant aims to increase road safety by working on warnings for approaching ambulances and other emergency services, passing red crosses, dynamic driving speeds and correctly displaying "dos and don'ts" on the dashboard to road users. In addition, the signatories intend to implement strategic routing in urban areas, for example in school zones. The covenant also aims to explore how cars can digitally request access to urban areas when they seek to enter an environmental zone.

These developments are annually tracked in the Monitor Smart Mobility, with the latest update presented to the House of Representatives in March 2024[1]. This monitor evaluates progress in vehicle automation, traffic management, information services, and mobility services, providing essential insights into how ITS initiatives are advancing the Ministry's vision. The findings serve as a foundation for this report, outlining how ongoing efforts are shaping a more efficient, safe, and sustainable mobility system in the Netherlands.

1.3 General overview of the national activities

A general overview of the most relevant activities in the reporting period, related to the European ITS Directive, is provided below. These activities contribute to the compatibility, interoperability and continuity of ITS solutions across the European Union (EU) and are also complementary to the Dutch policy goals with regard to ITS.

1. Digital System for Mobility data

Reliable and accessible digital travel and route information is essential for the effective functioning of the Dutch mobility system. Therefore, in the coming years, efforts will focus on the systematic unlocking of mobility data through the Digital System for Mobility Data (DSM). The DSM is defining and establishing an organised and coherent framework of national and local digital services, standards, data, data sources, and agreements with public and private stakeholders regarding the use of mobility data. This includes all mobility data that will be shared under the ITS directive and the Delegated Regulations. In this way, information about any modality can be efficiently shared,

[1] Kamerbrief over geactualiseerde Monitor Smart Mobility 2024 | Kamerstuk | Rijksoverheid.nl

such as road and traffic regulations and restrictions (i.e. environmental zones, speed limits, and school zones) and multimodal travel information (i.e. public transport schedules, real-time updates on delays, accessibility details for stops, and vehicle occupancy rates).

As an important element of the DSM framework, the NTM with its Mobility Data Registry website facilitates the cooperation and interaction with the different mobility domain data providers, as well as providers and data consumers to find and use various types of mobility data. This includes a wide variety of data, from bicycle data to data regarding roads and electric vehicles charging stations, for the first time, all in one place. Currently, the registry contains over 80 datasets, including various road traffic datasets, as well as 20 sets of multimodal data and data on alternative fuels. The ambition is to expand this number of datasets in the upcoming period to hundreds, from various data owners.

With these features and service scope, the NTM fulfils and exceeds the European ITS Directive 2010/40 obligation of Member States to establish a National Access Point (NAP), to organise the access to and reuse of transport related data to help support the provision of EU-wide interoperable travel and traffic ITS services to end users.

The Ministry, NTM, and Geonovum (the executive committee for the National Spatial Data Infrastructure), have initiated the development of a data catalogue for mobility data within the scope of DSM. This catalogue will encompass legal agreements, geographical scope and outline the necessary datasets and corresponding quality characteristics required to meet established standards. Additionally, the concepts used within the datasets will be described, including the relevant interrelations. The catalogue will enable source, supervisory, and system managers to gain insight into the progress of each dataset and identify areas where assistance may be required. A prototype is expected to be available in 2025.

2. Safety Priority Services (SPS)

Within the framework of Safety Priority Services (SPS), the Ministry of Infrastructure and Water Management is collaborating with service providers and automobile manufacturers to deliver more comprehensive and improved in-car safety alerts to road users. Key aspects and results of the project are:

- Implementation of real-time warnings: The implemented system provides drivers with timely alerts about approaching emergency vehicles, traffic jams, road works, and other potential hazards;
- Data integration: It combines data from various sources, including the National Data Portal for Road Traffic (NDW) and private companies, to create a comprehensive safety information network;
- Feedback loop: Rijkswaterstaat, NDW and NTM regularly discuss data quality with service providers, resulting in improvements in data quality and optimisation of the processes;
- All safety regions (veiligheidsregio's) have now been connected. This results in (nearly) 100% of ambulances now being equipped with systems to issue warnings;
- All services within scope are provided by one or more partners. The following expansions were achieved:
    - Kia has realised the EVA service in 2024. It is being rolled out step by step across their connected vehicles;
    - Hyundai has realised the EVA service in 2024. It is being rolled out step by step across their connected vehicles;
    - ANWB implemented the EVA service in their Onderweg app in 2023;
    - TomTom implemented the EVA service in their AmiGo app and TomTom Hazard Feeds for the automotive industry in 2023;
    - ANWB implemented the transmission of information about road closures and maximum speeds (from the matrix signs) in their Onderweg app in 2023.
- The number of vehicle kilometres driven with the services resulting from this project increased by 34% over the course of the project (2022-2024);

- Response of users was positive. 85% of respondents indicate that the services improve safety, 80% found the quality and reliability to be good. Furthermore, after notification of an incident, 42% decelerates and 52% say that they are more alert.

This initiative demonstrates the Netherlands' commitment to leveraging technology and collaboration to significantly improve road safety and traffic management.

3. Road Monitor (ROMO)

The "Road Monitor- ROMO 1" project, initiated by the Ministry of Infrastructure and Water Management, was successfully concluded in 2024. Together with the support of Mercedes Benz it explored the possibilities of vehicle data in providing insights for road authorities in the fields of road maintenance and road safety. This initiative was conducted within three categories: Asset Management, Weather Management, and Road Safety. Road authorities received real-time data to explore if the data is valuable for performing their management and maintenance activities more precisely and efficiently, as well as for identification of potentially unsafe traffic situations within the infrastructure. Governments can get their insights through a dashboard.

The results of the ROMO project will be taken even further in a new iteration - Road Monitor 2 (ROMO-2), with the goal to provide road authorities in the Netherlands with use cases of real-time probe vehicle data, to enhance traffic management, road maintenance, and safety operational processes. The project aims to partner with more data providers, data collectors, service providers and users than ROMO-1.

4. Traffic Management Information for Route Advice (VM-IVRA)

The Rijkswaterstaat VM-IVRA programme has entered a new phase in the rollout of Digital Traffic Management. The goal of VM-IVRA is to share traffic management data elements from traffic control centres with service providers through NDW and NTM. The programme is exploring and defining the conditions under which service providers can incorporate this traffic management data into their information services. Additionally, it seeks to determine what these conditions mean for road authorities and their traffic management activities. This way, there is added value for road authorities, service providers, road users, and society. The initiative has passed its proof-of-concept phase and is now working on deployment of several services available to road authorities.

Examples of services

Positively evaluated services delivered through this project are:

- Information on road closure for tunnels, after an incident or due to unplanned roadworks;
- Provision of information about future road closure on recently or frequently driven road segments due to roadworks or events, which drivers receive pre- or post-trip;

Other services made available through this project are:

- Provision of information on environmental- and school zones;
- Digital Information Beacons (DIBs), which offer a digital alternative to physical VMSs;
- Road closures as consequence of an incident or roadworks;
- Restrictions due to weather conditions;
- Provision of information to enclosed traffic (i.e. due to an incident).

The services are now made available for all road authorities through dedicated tools and large effort is made to ensure that the services are not only implemented on a technical level, but also fit into existing processes of road authorities.

5. Dutch Metropolitan Innovations

The DMI (Dutch Metropolitan Innovations) ecosystem is a public-private partnership in which the central government, municipalities, the private sector and knowledge institutes are jointly committed to the accelerated realisation of smart and sustainable cities through optimal use of data and digital technology. To facilitate the safe and reliable sharing and (re)use of data, an infrastructure is developed within DMI. This infrastructure enforces the data sharing governance, which is based on a joint Set of Agreements to which all participants commit.

The DMI ecosystem fosters the development of intelligent applications, accelerated knowledge building and trusted data access between participating parties, in a socially responsible manner. Policy, investments in the physical domain (in the areas of, for example, spatial planning, mobility, climate and energy) and information technology are combined in integrated solutionsto improve urban functioning and make cities more sustainable.

DMI enables companies to develop new products and services and scale up faster for more effective solutions, while maintaining a healthy business perspective. Municipalities and other public authorities work together with private companies as developing partners with the aim of achieving accelerated implementation and greater uniformity in smart and sustainable urbanisation.

6. Facilitating multimodal travel / public mobility

The Netherlands has undertaken efforts to facilitate easier multimodal travel through availability of services and data, creating an intertwined mobility ecosystem. The national collaborative programme Shared Mobility aims to lay the foundation for adoption of shared mobility as a mature component of this system. Besides efforts in adoption and standardisation of policy and services for local governments, the programme is working on a digital system for shared mobility data in order to facilitate exchange of information for the sector in a future-proof manner. In the same sense, the Netherlands has made steps towards facilitating usage of mobility hubs by exploring the addition of static and dynamic mobility hub data into the public transport stop database. This will make it possible to include hubs into MaaS and other travel planning apps.

1.4 Contact information

For further inquiries, please contact vdi@minienw.nl.

2 Projects, activities and initiatives

2.1 Priority area I. Information and mobility ITS services

2.1.1 Description of the main national activities and projects

The following activities and projects will be highlighted in this section:

- IDEA, aimed at solving the issue of falsely reported roadworks in navigational services due to incorrect data;
- VM-IVRA, focusing on sharing information from traffic management centres with service providers;
- NAPCORE, which is the coordination mechanism to improve interoperability of the European NAPs as backbone of European mobility data exchange;
- Digital aspects for roadworks, aiming to establish a unified process and clear agreements to enhance the quality of data on planned disruptions and ensure safety related to this data;
- National collaborative programme Shared Mobility, laying the foundation for shared mobility as a mature component of the mobility system.

Intelligent Data Exchange Alliance (IDEA)	
Stakeholders	NDW, and 19 partners including all 342 municipalities
Status	In progress
Timescale	2024-2028
Resources	Public funding, EU-subsidy

Objectives:

IDEA validates data of planned roadworks, road closures and other RTTI data items with (near) real-time Floating Car Data (FCD) and potentially other data sources. It can determine whether the road segments are actually closed, delayed or open, in real-time.

In the Netherlands, both data sources are currently available: road authorities generally provide data regarding planned roadworks/road closures to NDW, who publishes the data through NTM. Additionally, NDW publishes FCD for all roads on a national scale through NTM.

To solve the issue of falsely reported roadworks (e.g. due to rescheduling or unforeseen weather circumstances), IDEA merges the planned roadworks data with real-time traffic flow and creates additional value from available data. Roadworks that are falsely reported according to the IDEA solution (with a 99.9% certainty) will be filtered out of the live feed. This will drastically improve roadworks/road closures data for all parties using this information, most notably navigation service providers. IDEA leads to several key benefits:

- High quality, validated and real-time data for service providers, for more accurate routing solutions, and efficient traffic patterns.
- Discrepancies between planned and actual roadworks are accessible for road authorities and other data quality issues can be indicated to the data owner.
- A dashboard for road authorities to track data quality for various data items.
- Feedback from service providers on how the data is used, motivating road authorities to improve the quality of their data.

Milestones and impact:

Completed

- Setting up a validation model using the planned data and traffic pattern/flow information.
- Validating published roadworks information in real-time through the model and making the results available in a separate feed.
- Upscaling the system to cover all Dutch roads.

In progress

- Implementing a feedback interface for near real-time feedback from service providers on the validated data.
- Enhancing the validation model with new and improved validation data sources.
- Adoption of the concept in two EU pilot cities (Finland and Portugal)
- Integrating the process within the NDW core architecture and filtering the active road networks feed based on the validation model, resulting in one feed with accurate, real-time information.

Planned

Development and implementation of automatic validation algorithms for additional data items., starting with the RTTI-prioritized data items.

The work will be carried out by NDW within the scope of their ongoing projects: a DS4SSCC funded project and a proposed CEF project.

Traffic Management Information for Route Advice (VM-IVRA)	
Stakeholders	Rijkswaterstaat, National Traffic Data Portal (NDW), The Metropolitan Region Rotterdam-The Hague (MRDH), The Amsterdam Metropolitan Area (AMA), Regions of North and East Netherlands, Service providers: Be-Mobile (Flitsmeister), TripService, Locatienet and ANWB
Status	In progress
Timescale	2019 – present
Resources	• Co-funding EC Connecting Europe Facility (CEF) • Rijkswaterstaat • The Ministry

Objectives:

The goal of VM-IVRA is to share traffic management data elements from traffic control centres with service providers through NDW and NTM; to examine the conditions under which service providers can incorporate this traffic management data into their information services; to determine what this means for road authorities and their traffic management activities. This way, there is added value for road authorities, service providers, road users, and society.

Milestones and impact:

Completed:

- Traffic manager and service provider collaboration model descriptions and best practices.
- Traffic manager information service and use case descriptions in collaboration with service providers.
- Traffic manager information open data feeds service operational at NDW.
- Operational service requests from Traffic Management Centres (TMCs) for in-car variable message services.
- Proven Datex II standard model and message definitions ("Open data feeds" and "Service requests").
- "Digital Information Beacon (DIB)" tool for TMC request to service providers.
- "Diego" digitisation tool for traffic management scenarios and DIB configurations (text and locations) and sharing of current road obstructions (e.g. tunnels, roadworks).
- "George" digitisation tool for environmental- and school zones. (Nationwide open data feed for service providers available incl. 7,100 schools, 2,100 school zones)
- "Melvin" digitisation tool for planned roadworks included with "Advance notices of roadworks and events". Deployed at 155 roadworks (2024) informing approx. 5.1M motorists.

Planned:

- Embedding a new approach by road authorities/traffic control centres.
- Developing a collaboration and transaction model with service providers.
- Ensuring management by road authorities and NDW.
- Scaling up usage with road authorities and service providers.
- Consolidating and advancing the toolkit (e.g. strategic routing).
- Integration of further traffic management services digitalisation with Diego, Melvin and George.

NAPCORE (National Access Point Coordination Organisation for Europe)	
Stakeholders	From the Netherlands: NDW and the Ministry. 36 participants of which: 33 beneficiaries covering 26 EU Member States and 3 associated partners. In addition, there are 37 Implementing Bodies.
Status	In progress
Timescale	2021-2025
Resources	• Co-funded EU CEF • Co-funded by partners from 26 European countries

Objectives:

NAPCORE was launched as the coordination mechanism to improve interoperability of the European NAPs as the backbone of European mobility data exchange. The ITS Directive 2010/40/EU and its Delegated Regulations require that each European Member State must establish an NAP for mobility data. By now, there are more than 30 operational NAPs in virtually all EU Member States (and beyond), where mobility related data is published and made available for use in travel information services. The Netherlands aims to seize such European cooperation by initiating dialogue and collaborating on pertinent issues with other Member States. A recent example of this commitment is the initiative to collaborate with NAPCORE partners in creating a dialogue between public authorities and data navigation service providers. This initiative seeks to address the challenges related to data quality and usage requirements stemming from the recent update of the Real-Time Traffic Information (RTTI) Delegated Regulation.

NAPCORE improves the interoperability of mobility data in Europe with mobility data standard harmonisation and alignment. Also, NAPCORE increases access and expands availability to mobility related data by coordinated data access and better harmonisation of the European NAPs.

Furthermore, NAPCORE empowers NAPs and National Bodies (NBs) by defining and implementing common procedures and strategy, strengthening the position and the role of NAPs, supporting steps towards the creation of Europe-wide solutions to better facilitate the use of EU-wide data.

The Netherlands leads NAPCORE tasks working on the enhancement of NAP level of service harmonisation as well as the DATEX II standardisation activities. The Netherlands is also an active partner in the development of the European NAP Architecture reference, is exploring the concept of an NAP Marketplace through a demonstrator and is currently implementing mobilityDCAT-AP.

Milestones and impact:

Working groups subjects, main milestones with active or leading participation of the Netherlands include:

- WG 1 NAP & NBs platform strategy and governance
  a. Strategy towards EU policies and developments
  b. Strategy towards stakeholders and activities (non-EU policy related)
  c. Future and sustainable governance structure of the NAP/NB platform
- WG 2 NAP interoperability and level of service of NAPs
  a. Levels of service of NAPs – led by the Netherlands
  b. Data standards, reference profiles and metadata and support tools
  c. NAP architecture
  d. NAP service interoperability demonstrators – Marketplace demonstrator led by the Netherlands
- WG 3 NAP content and accessibility
  a. Data content requirements
  b. European NAPs data quality
  c. Data access and reuse
  d. Data Exchange Vision
- WG 4 Data Exchange Standards
  a. Roadmap for harmonisation
  b. DATEX II & TN-ITS – led by the Netherlands
  c. Multimodal data

d. Metadata
- WG 5 NB and compliance assessment

Digital aspects for roadworks	
Stakeholders	This project is initiated by CROW in collaboration with national, regional and local road authorities, service providers and other private parties as suppliers of traffic signs, data service providers, and road construction companies.
Status	In progress
Timescale	2023 - 2025
Resources	Funded by public parties

Objectives:

This project aims to establish a unified process and clear agreements to enhance the quality of data on planned disruptions and ensure safety related to this data. With increasing reliance on real-time and digital information for vehicle systems, uniform processes are necessary to enable real-time data sharing, particularly for traffic regulations (e.g., speed limits) and lane restrictions or road closures during roadworks.

Key goals include:

- Ensuring road authorities can easily integrate digital aspects of roadworks into contracts via standardized methods.
- More safety for roadworkers and travellers
- Reducing wayfinding efforts by ensuring earlier awareness of closures, enabling navigation systems to calculate optimal routes at the start of a journey or immediately upon closure detection, thereby preventing drivers from reaching the closed section—avoiding potential gridlocks and reducing CO_2 emissions, especially on lower-class roads where fuel consumption is statistically highest.
- Enabling real-time reporting of speed restrictions and road closures during roadworks, increasing safety and getting more optimal detours.
- Establishing processes to validate and regulate access to systems for third parties while maintaining data security and responsibility with road authorities.

The result will be a standardized and widely applicable process for real-time data sharing, benefiting road safety, road workers, travellers, and the surrounding environment.

Milestones and impact:

Potential impact on ITS Goals (based on expert judgement):

1. Traffic Safety: Real-time data on speed limits and road closures improves the accuracy of in-car systems like ISA (Intelligent Speed Assistance), helping drivers comply with traffic rules and reducing the number of unexpected situations. This can reduce speeding and prevent accidents in work zones. A 5-20% reduction in accidents in work zones is achievable.

2. Traffic Flow: Higher data quality allows navigation services to plan more accurate detours, reducing unnecessary rerouting and preventing congestion. This minimises delays and improves traffic flow. A 5-15% reduction in vehicle delay hours is achievable, depending on traffic density and data accuracy.

3. Sustainability: Less unnecessary rerouting and more efficient traffic management reduce fuel consumption and CO_2 emissions. It also contributes to better air quality around work zones and detour routes. An estimated 5% reduction in CO_2 emissions can be achieved.

Achieved milestones are:

- First draft process outlining the steps leading to real-time access to temporary restrictions and limitations.
- Initial concepts for improving the machine readability of physical road signs and aligning them with current hazard situations.

National collaborative programme Shared Mobility (Natuurlijk!Deelmobiliteit)	
Stakeholders	the Ministry of I&W and many local and regional governments, CROW, NTM
Status	In progress
Timescale	2024-2029
Resources	Public funding

Objectives:

Shared mobility is still in its infancy. The programme's ambition is that within five years, the foundation will be laid for shared mobility as a mature component of the mobility system. Main objectives are:

- Steering towards adoption and standardisation of policy and services for shared mobility within local governments;
- Annual monitoring and evaluation of development of shared mobility;
- Increasing public knowledge and improving attitude among the Dutch public regarding shared mobility.

The ITS related objective within the collaboration programme is the development of a uniform method of data collection and dissemination (for enforcement, evaluation, policy-making, (potential) research, and management). A national digital system for shared mobility is needed to organize the exchange of data for the sector in a future-proof manner.

Milestones and impact:

These ambitions led to the following ITS related activities/milestones:

1. Developing the Dutch Profile Data Shared Mobility v1.0 for shared two-wheelers and shared cars, in collaboration with CROW, NTM.
2. Approach/design of the national digital system for shared mobility via DSM, in cooperation with NTM, DMI, and the Ministry of Infrastructure and Water Management (lead). This includes the necessary legal bases and policy rules to allow this system to function systematically and lawfully.
3. Monitoring developments in the field of dashboarding and existing service providers, the collective needs of governments, etc., and any role from the collaboration programme.

Goals for 2025 are:

1. Finalising the Dutch Profile.
2. A proof of concept of standardised and automated sharing of data in the municipality of Utrecht.
3. An elaborated description with explicitly described roles for the Digital System of Shared Mobility data.
4. Further exploring the necessary legal bases and policy rules for each administrative layer.

2.1.2 Progress since 2023

Significant progress has been made within this priority area since the last reporting period. A highlight of this progress is the upscaling of the feedback loop developed in IDEA for the whole Dutch road network, enhancing roadworks data quality. Furthermore, information on upcoming roadworks or events through notices were deployed, already reaching an approximate 5.1 million road users. With the addition of initiatives such as digital aspects for roadworks, steps have been taken to make information for road users more reliable. In addition, the first layers of the foundation for the Dutch shared mobility ambitions were laid, making progress towards a digital system for shared mobility.

2.1.3 Delegated Regulation (EU) 2017/1926 on the provision of EU-wide multimodal travel information services (priority action a)

In 2023 the revised Delegated Regulation MMTIS was published. An impact assessment of the regulation was conducted, providing insight into what extent the Netherlands complies with the obligations in the current and revised MMTIS delegated regulations, including obligations regarding data availability.[2] The impact analysis concluded that the Netherlands complies to some extent, but in order to fully comply, actions are still needed. True multimodal travel advice is still limited, as data on both shared mobility, as well as mobility hubs is not yet available as open data. Work is being done to fill these gaps. The national collaborative programme shared mobility is currently exploring various options to implement a data portal for shared mobility. Furthermore, the national programme for mobility hubs is investigating possibilities of expanding the existing Central Stop Database (CHB), which includes all public transport stops, with static and dynamic data on mobility hubs.

During this reporting period, the Netherlands has made significant progress in transitioning to the NeTEx interface for sharing all static travel information. The transition is expected to be finalized at the beginning of 2025. Furthermore, progress has been made concerning the data items listed in the DR (EU) 2017/1926. A list of progress on specific data items is provided below.

- The geometry/map layout structure of all train stations are currently provided as test data through NDOV, using the European Passenger Information Accessibility Profile (EPIAP). This also includes facilities at access nodes, such as lifts, escalators, entrances and exit locations. In the following reporting period, the Netherlands aims to include access nodes within cities, such as metro stations.
- NeTEx flex has been implemented to provide flexible information for public transport without fixed schedules. This standard is being extended to facilitate the provision of flexible information on public transport with dynamic routing (i.e., demand driven public transport).
- Vehicle characteristics and facilities, such as Wi-Fi and emission characteristics are currently shared through NeTEx by one public transport (PT) operator. This number is expected to increase in the following years.

Accessibility of information is expected to continue improving over the coming years due to new requirements added to concessions. PT operators often adopt the new data requirements for their entire operations, not just specific concessions, leading to increased data availability on a faster pace than renewal of concessions.
In addition, a Standard Interface for Real-time Information (SIRI) profile will be approved soon, enabling sharing of dynamic travel information, including status of operation for lifts and escalators.
Data quality is continuously monitored by DOVA through continuous checks. Results of these checks are discussed regularly among DOVA, the PT operator and the PT authority.
The Netherlands is developing the philosophy of Public Mobility. In context of these developments, DOVA is working on sharing data on mobility hubs and shared vehicles in collaboration with other related data nodes (i.e. shared mobility).

2.1.4 Reporting obligation under Delegated Regulation (EU) 2022/670 on the provision of EU-wide real-time traffic information services (priority action b)

On February 2, 2022, the revision of the EU delegated regulation on RTTI Services was published and the ITS Delegated Regulation (EU) 2022/670 RTTI became effective. An impact assessment of the new regulation was conducted, providing an overview of the obligations the revised delegated regulation prescribes, whether the Netherlands currently meets these obligations, as well as

[2] MMTIS impact analysis

several scenarios for implementation.[3] The assessment also provided insights regarding the feasibility of the regulation and ways to develop scenarios for implementation of the RTTI:

1. Further definition of data types as stated in the regulation.
2. Specification of quality requirements based on consultation with service providers and government usage.
3. For each data type, to determine what actions are required to comply with the RTTI regulation.
4. Development of viable implementation scenarios for delivering the requirements in the RTTI regulation.

The study also collected the current degree of machine-readability of the required data types, in order to assess the obligation arising from the RTTI requirements to make data digitally available applies only to data already available in a machine-readable format. The assessment showed that, at this time, 25 of the 47 data types are available in a machine-readable format. In eight cases, the data types are partially available, with two cases affected by legal restrictions. Six data types are known to be unavailable in a machine-readable format. For the remaining data types, it is unclear to what extent they are available in a machine-readable format.

From the 25 data types available in a machine-readable format, 11 data types do not have a complete coverage of the required geographical scope (the primary road network in the case of the Netherlands).

For most datasets a description (metadata) is often available, including publication location, application area, quality, data exchange and contact information of the data provider.

Public data sources that cover real-time information include: road network and road characteristics, roadworks, road and lane closures, accidents, parking data, hydrogen refuelling stations and locations of electric charging stations. It contains public data (NDW, Rijkswaterstaat) and private data (TomTom, Here Technologies). The current situation has not changed substantially over the last year, except for the fact that the content is updated constantly, and new sources have been added.

The Netherlands established a broad foundation for data availability. This foundation allows the next steps in setting up structural quality assurance for the data items needed for priority information services.

Improvements of the data are made by:

- Ongoing cooperation between public and private parties (e.g. Safety Priority Services, VM-IVRA).
- Data aggregation and fusion (combining information from detection loops with floating car data).
- Use of feedback loops (jam tail warning, incident information).
- Supervision of the terms of use of the NAP by NDW.
- Development of the NTM service and its data findability and accessibility features.
- NDW, on behalf of the participating governments, has purchased a large amount of real-time traffic data in the form of floating car data for the entire Dutch road network.

The following activities were planned in the current reporting period:

- In addition to consolidating the existing road traffic data flow, more emphasis has been placed on further improving the data quality. More attention is also being paid to non-roadside related data collection (including floating car data).
- The implementation of SPS (Safety Priority Services), which provided road users with better road events warnings on their in-vehicle dashboard and in their navigation system during their trip. This brings RTTI and Safety Related Traffic Information (SRTI) services closer together. Agreements have been made that service providers offer e.g. incident

[3] RTTI Impactanalyse en scenario's

information, mandatory and prohibition signs. Traffic jam tail warning is being prepared for roads without signalling systems.
- The digitisation of traffic management plans (regelscenario's) via the "Diego" web platform is almost completed.

No active testing, assessment and/or enforcement activities took place between 2023 and 2024. To ensure improvement of ITS services, the Ministry works closely together with road authorities, service providers and data suppliers, e.g. by increasing data categories and data quality through NTM. Since the revision of the ITS Directive, the Ministry has started discussions with several institutions about taking the role of National Body and thus carrying out national compliance enforcement. These discussions are still ongoing and a decision is yet to be made.

2.2 Priority area II. Travel, transport and traffic management ITS services

2.2.1 Description of the main national activities and projects

The following activities and projects will be highlighted in this section:

- ROMO, which has a focus on vehicle information related to road maintenance, winter management and traffic safety;
- Connected Transport, which applies an innovative approach to modernising freight and logistics systems through the use of advanced digital communication technologies;
- Policy based network management, aiming to develop standardised performance indicators for traffic signal systems along key routes.

Road Monitor (ROMO)	
Stakeholders	The Ministry, Mercedes-Benz, Port of Rotterdam Authority, CROW, Royal Netherlands Meteorological Institute, NDW and many local and regional governments
Status	Completed
Timescale	2022 – 2024
Resources	Funded by the Ministry of Infrastructure and Water Management

Objectives:

Over the past 2.5 years, the Ministry of Infrastructure and Water Management, Rijkswaterstaat and NDW, in collaboration with road authorities, have become acquainted with the use of vehicle information for asset management, winter management and road safety. As part of the Road Monitor (ROMO) project, road authorities received real-time information about situations and road conditions. The aim of this was to introduce road authorities to the new source of information and to discover by trial and error what the added value of vehicle information can be.

The intention is to follow up on ROMO in 2025. Starting points for the next phase are:

- Obtaining greater coverage of vehicle information by purchasing information from multiple suppliers.
- Get more types of information and more detailed information.
- Purchasing information over a longer period of time (4 years).
- Adoption of vehicle information by road authorities, so that there are also buyers of the information after ROMO 2 has ended.

Milestones and impact:

The ROMO project concluded and was evaluated in 2024. General conclusions of the evaluation were:

- The public authorities are interested in the vehicle information that could be introduced within ROMO.
- Vehicle information is seen as an additional source of information, it is not (yet) a replacement for the current measurement methods.
- Vehicle information is not yet out of the innovation phase; a quality improvement is still needed on several data sources. But even within road authorities, processes still need to be adjusted to be able to implement/use this data in work processes.
- The potential of vehicle information for road authorities increases with upscaling (geographical coverage/supply). The willingness to implement vehicle information only comes into play if vehicle information can be used to obtain a clear picture of the entire area.

(potential) added value of vehicle information will be:

- Because there is more frequent insight into possible risks (damage, accidents, slipperiness), the deployment of personnel can be better prioritised, and risks of accidents and breakdowns are reduced.
- With vehicle information, road authorities have insight into the entire area and are not or less dependent on measurement systems at a limited number of locations. It is expected that the added value will be greatest on the underlying road network and that reliability will increase as the fleet in question increases.
- Because vehicle information is more up-to-date and provides insight into the entire area, more adequate action can be taken. This has an impact on planning (more stable maintenance planning), road availability (planned instead of unplanned) and costs (only taking measures when it is really necessary or taking measures earlier).

Connected Transport	
Stakeholders	Ministry of Infrastructure and Water Management, Provinces of Zuid-Holland, Noord-Holland, Utrecht, Noord-Brabant, Limburg, Zeeland, Landelijk Verkeers Management Beraad, Rijkswaterstaat, Amsterdam Logistics, SmartwayZ.NL Gemeente Almelo, Many IT-service providers for Logistics, many transportation/ logistics parties and many others
Status	In progress
Timescale	2018 – present
Resources	Funding through various public and private parties

Objectives:

Connected Transport in the Netherlands refers to an innovative approach to modernizing freight and logistics systems through the use of advanced digital communication technologies. It is part of a larger Intelligent Transport Systems (ITS) framework that aims to enhance the efficiency, safety, and sustainability of transport networks. This initiative leverages real-time data sharing between vehicles, infrastructure, and other transport stakeholders to optimize logistics operations and reduce environmental impact.

Increase Road Safety:
- Use connected technology to prevent accidents by providing drivers with timely warnings and adaptive traffic management systems.

Boost Efficiency in Logistics:
- Reduce delivery times and costs through better route planning, real-time updates, and automated processes.

Support Sustainability:
- Lower fuel consumption and emissions by minimizing congestion and improving vehicle utilisation.

Milestones and impact:

It is an ongoing initiative that has already seen pilot projects in specific corridors, with further rollouts planned in the coming years. The goal is to establish the Netherlands as a leader in smart and sustainable logistics.

The following milestones have been achieved so far:
- Various ITS use cases available such as truck priority at smart traffic lights
- Approx. 1500 trucks connected to the ecosystem
- Approx. 1300 smart traffic lights (iTLCs), with approx. 350 providing priority for logistics
- Multiple 'connected transport' corridors defined, where road operators provide priority for logistics
- On-going public-private collaboration on the topic of ITS
- Free open source interfaces for using the services (**link**) and demo applications (**link**)

Policy based network management	
Stakeholders	CROW and DMI-Ecosystems collaborates with several road authorities and private parties like Technolution, DTV consultants, SWECO and Royal Haskoning DHV.
Status	In progress
Timescale	2023 – 2025
Resources	Public investments
Objectives:	
The project aims to develop standardized performance indicators (KPIs) for traffic signal systems along key routes, which contributes to achieving the SUMP (Sustainable Urban Mobility Plan). It focuses on improving the management of traffic flows and enhancing overall traffic safety and efficiency through the use of intelligent traffic control technologies. The initiative seeks to transition from focusing solely on intersection-level management to considering entire corridors, optimising traffic across these broader areas. Key objectives include improving mobility quality, incorporating sustainability goals, and aligning with European standards for traffic circulation plans. These KPIs are essential for embedding policies that provide effective oversight and control of smart traffic lights, ensuring alignment with mobility, safety, and sustainability goals.	
Milestones and impact:	
The impact of policy-driven regulation on the ITS goals of safety, traffic flow, and sustainability could be significant, based on expert judgment. For safety, more consistent regulation could reduce the number of accidents, while for traffic flow, improvements could range from 5-30% due to better traffic management. In terms of sustainability, enhanced traffic control through AI and KPIs might lower CO_2 emissions by 5% or more, particularly by reducing fuel consumption and congestion. These improvements depend on the widespread adoption and refinement of smart traffic systems. Achieved milestones are: • KPIs set per modality • Pilot in Apeldoorn • Framework based on pilots in Apeldoorn and Utrecht and the implementation in the city of Copenhagen.	

2.2.2 Progress since 2023

The previous years have resulted in major steps within this priority area. An important highlight is the finalisation of the ROMO project, exploring the use of information from vehicles for management processes of road authorities. Due to large interest, the pursuit will be continued with an increased number of stakeholders. Furthermore, significant progress has been made in facilitating logistics by connecting trucks with the road infrastructure, enabling the prioritisation of trucks at intersections and thus reducing stops. When applying prioritisation use cases on a large scale, it is important to look at effects on a network level. Policy based network management made progress to make this a reality, setting specific KPIs for each modality and making steps towards embedding policies of local governments in (AI-driven) smart traffic light control.

2.3 Priority area III. Road safety and security ITS services

2.3.1 Description of the main national activities and projects

The following activities and projects will be highlighted in this section:

- C4Safety, investigating how to best provide trusted safety related in-car warnings for roadworks and emergency vehicles approaching or securing incidents;
- Safety Priority Services, aiming to provide road users with more and improved in-car safety warnings, either via the car's dashboard, or through a navigation service;
- National working group ISA, focusing on improving road safety by supporting governments, road authorities, and technology providers in the adoption and effective use of ISA systems.

C4Safety	
Stakeholders	Initiative from Rijkswaterstaat in commission of the board of directors Smart Mobility, NDW, Contractors (including both the contractors responsible for carrying out the roadworks (e.g. Heijmans, etc.) and the (sub)contractors specializing in roadwork safety measures), other road authorities (mainly provinces), service providers
Status	In progress
Timescale	2021-2025
Resources	• Funded by RWS/ the Ministry • Possible contributions from market parties in the form of providing data on roadworks
Objectives:	
The C4Safety project aims to enhance safety during roadworks and road inspector interventions on all motorways by improving the roadworks and emergency vehicle positioning data and making these data available for automated in-car warnings. Unfortunately, collisions between motorists and road operator vehicles during interventions, or crashes involving absorbers or vehicle-mounted arrow boards during roadworks remain a significant issue, with a record number of crashes in 2021. The project contributes to the RWS goals of optimising both safety and throughput on the motorway network. The improved data and information generated through C4Safety will be shared under the condition that notifications are accurate, reliable, timely, trusted and internationally aligned with current standards. Furthermore, existing digital infrastructure will be leveraged to implement these services. The project will also lay the foundation for future communication with vehicles, enabling a broader variety of services. Messages will be distributed in both DATEX-II and DENM formats. The above objectives were aligned in the board of directors Smart Mobility.	
Milestones and impact:	
In 2024, a Minimum Viable Product (MVP) of the data service was delivered. This MVP already includes data processing and delivery about a large number of road works and road inspector interventions. Currently, developments are focussed on the completeness of the data and on increasing the quality from the "as-is" state to the prescribed C-ITS quality standards. At the same time, progress has been made in establishing the entire process - from activating a use case to delivering the information to the road user. This includes embedding these processes within the Rijkswaterstaat organisation, as well as in the operations of related stakeholders.	

Safety Priority Services	
Stakeholders	The Ministry, ANWB, Be-Mobile, Hyundai, Inrix, Kia, TomTom.
Status	In progress
Timescale	2022 – 2025
Resources	Public funding and EU funding, 12 million euro

Objectives:

In this project, the Ministry works together with six private parties (car manufacturers, navigation service providers and mapmakers) to provide road users with more and improved in-car safety warnings, either via the car's dashboard, or through a navigation service. A large number of other car manufacturers and navigation service providers are involved through these companies as well. Government data is used to alert drivers in case of potentially dangerous situations, taking into account limiting driver distraction. The aim is to improve and expand the information for road users and make it more widely available. This collaboration will make traffic on all roads in the Netherlands not only safer, but also more efficient and sustainable for all road users.

Five services have been deployed during this project:

Traffic jam tail warnings

In the event of a large difference in speed between your own vehicle and the last vehicle in a traffic jam further down the road, you will be warned to reduce speed. Unlike, for example, the variable message signs above the road, not every road user receives a warning at that location and at that time: only if it threatens to become dangerous in view of the difference in speed. The warning can be given on all roads: on the motorway, but also on provincial or municipal roads.

Emergency services warnings

You receive a warning if an emergency service vehicle approaches. You will see the direction from which the emergency service is approaching, so that you will not be surprised, and you can prepare for possible swerving or adjusting your speed.

Other warnings

- Temporary slippery road
- Animals, people, obstacles and debris on the road
- Unsecured accident location
- Short-term roadworks
- Poor visibility
- Wrong-way drivers
- Unattended roadblock
- Extreme weather conditions

The provision of relevant information on these eight situations is regulated within the EU. Certain data comes from companies, while other data comes from governments. Together, the complete picture can be provided.

Information on traffic rules

- Applicable maximum speeds, including dynamic maximum speeds on the VMSs above the road
- Lane advice through VMSs above the road
- Other information useful to road users (environmental zones and route information)

Smart routing

The SPS partners can also offer 'smart routing' in due course, in addition to the various road safety warnings. A route will then be suggested to help you will avoid potentially unsafe traffic situations, such as school zones during certain periods on school days, or zero-emission zones for fuel cars.

Milestones and impact:

The abovementioned services have been implemented and the project is currently under evaluation. User surveys were conducted in 2023 and 2024.

- 85% of respondents indicate that the services improve safety;
- 80% find the quality and reliability of the information to be good;
- 75% acknowledge the warnings for hazardous situations;

- 42% brake and 52% indicate being more alert after a digital notification of an accident;
- The notifications are sometimes perceived as distracting.

Other milestones are:

- All safety regions (veiligheidsregio's) have now been connected. This results in (nearly) 100% of ambulances now being equipped with systems to issue warnings;
- The number of vehicle kilometres driven with the services resulting from this project increased by 34% over the course of the project (2022-2024).
- All services within scope are provided by one or more partners. The following expansions were achieved:
    - Kia has realised the EVA service in 2024. It is being rolled out step by step across their connected vehicles.
    - Hyundai has realised the EVA service in 2024. It is being rolled out step by step across their connected vehicles.
    - ANWB implemented the EVA service in their Onderweg app in 2023.
    - TomTom implemented the EVA service in their AmiGo app and TomTom Hazard Feeds for the automotive industry in 2023.
    - ANWB implemented the transmission of information about road closures and maximum speeds (from the matrix signs) in their Onderweg app in 2023.
- In Safety Priority Services, the remuneration for the services "Traffic Jam Ahead Warning " and " Emergency Vehicle Approaching " were aligned with the number of vehicle kilometers delivered. As a result, this remuneration system is now much more strongly linked to the scale of (plausible) outcomes delivered. It also prevents public funds from being invested in developments that do not or hardly result in actual returns. This approach has been well received and will be implemented as much as possible in future projects.

National working group ISA	
Stakeholders	27 public private parties are involved in this national working group: Governmental organisations: The ministry of I&W, Rijkswaterstaat, NDW, RDW Regional programmes: SmartwayZ.NL, MRDH; Road authorities: Provinces of Noord-Holland and Overijssel; Local road authorities: Amsterdam, Den Haag, Eindhoven, Helmond, Rotterdam and Tilburg. National (research) organisations: ANWB, CROW, Fietsersbond, SPV and SWOV; Private organisations: AI Infrasolutions, Andes, BAM, Cyclomedia, HR groep, POL-Heteren, VIA Software solutions and V-Tron. Working group ISA also collaborates with TNO and CBR on an occasional basis.
Status	In progress
Timescale	The working group was established in 2022 by the "Krachtenbundeling Smart Mobility" national programme, CROW and the Ministry of I&W. Since the programme ended in 2023, the working group is hosted by CROW.
Resources	Public investment

Objectives:

The Intelligent Speed Assistance (ISA) Working Group focuses on improving road safety by supporting governments, road authorities, and technology providers in the adoption and effective use of ISA systems. These systems provide drivers with feedback on speed limits, helping to prevent speeding and reduce the likelihood of accidents.

Key objectives of the working group include:

- Developing and disseminating knowledge on ISA and its integration with other Advanced Driver Assistance Systems (ADAS).
- Ensuring the availability and quality of speed-related data, critical for ISA functionality.
- Updating and refining guidelines to facilitate the implementation of ISA systems across various vehicles.
- Promoting collaboration between public and private stakeholders to align efforts in improving traffic management and safety.

Additionally, the working group ensures a holistic approach by addressing the interaction between vehicle systems, physical road signage, accurate data, and road user behaviour. This integrative effort aims to create safer roads and support the seamless adoption of ISA across vehicles and regions.

Milestones and impact:

By improving the effectiveness of ISA and bringing stakeholders together to collaborate on its quality, the likelihood of users turning off ISA decreases, and its utility is better recognized. More ISA users lead to greater awareness among drivers about speed violations, which in turn lowers speeds, enhancing road safety and reducing fuel consumption. The ISA Working Group's efforts align with core ITS objectives, offering benefits in safety, efficiency, and environmental sustainability.

Achieved milestones are:
In 2023:

- Lay a strong foundation
- Presentation at POLIS conference
- 4 working group session with knowledge exchange

In 2024:

- Deliverable Step-by-step plan for ISA (Intelligent Speed Assistance) for road authorities
- Deliverable Position paper on ISA, focusing on the effects of ISA on traffic safety
- Deliverable Effects of ISA on road safety
- 3 working group sessions with knowledge exchange

2.3.2 Progress since 2023

With the conclusion of the SPS project, deployment of important safety related services, such as traffic jam tail warning and emergency services warnings, has made significant steps. Through a user survey, a high level of satisfaction was found among users of the information, increasing perceived safety and awareness of road users. Steps were made to increase the number of safety related warnings on motorways, aiming to provide warnings on downstream roadworks, as well as road operator vehicles during emergencies, through the C4Safety project. Furthermore, the national working group for Intelligent Speed Assistance is collaborating to improve effectiveness of the system by supporting governments, road authorities and technology providers in the adoption and use of the system.

2.3.3 112 eCall (priority action d - Delegated Regulation (EU) No 305/2013)

"eCall" stands for "Emergency Call." This safety system in vehicles automatically gets in touch with the National Dispatch Centre following an accident, conveying information such as the precise location and the number of occupants inside the vehicle. This data helps emergency services to prepare more effectively and reach the scene promptly. The operator intercepts clear obvious cases and then connects the call to the Regional Emergency Centre (Regional Police, Ambulance and Fire Brigade). The position data and minimum set of data (MSD) is transferred to the regional centre.

The Ministry of Justice and Security, specifically the National Police, is responsible for implementing the National Dispatch Centre. The Dutch Authority for Digital Infrastructure is designated as the national body within the framework of the eCall obligations. The Dutch Authority for Digital Infrastructure is a part of the National Public Safety Answering Point (PSAP).

Concrete steps are being taken within the National Dispatch Centre to meet the Next Gen eCall obligations by the set deadline of January 1, 2026.

In line with these obligations from the European Commission, the National Dispatch Centre in Driebergen is almost ready to receive, handle, and process emergency communications using "packet-switched" technology.

It is currently expected that the Netherlands will be able to commence production testing with Next Gen eCall around Q2 of 2025.

2.3.4 Reporting obligation under Delegated Regulation (EU) No 886/2013 on data and procedures for the provision, where possible, 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 and Delegated Regulation 2013/886 Action C) requires Rijkswaterstaat to relay safety-related messages to service providers. The information (data) that Rijkswaterstaat shares with service providers (through the SRTI feed at the NAP) 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 phases of traffic lights) and safety-related messages (Weather related warnings, detected slipperiness, wrong-way drivers, incidents, obstacles on the road, road inspectors during an intervention, roadworks warning).

In turn, service providers and the Rijkswaterstaat Traffic Information Service are able to share information with the road user via radio, web pages, navigation systems, apps and/or social media.

The information shared through the SRTI feed is often the result of a specific and already existing process. For example, road inspectors in intervention warnings are activated when their vehicle-mounted VMS is deployed, obstacle on the road warnings are only sent when verified by a traffic management centre (and when expected to remain necessary for more than 10 minutes) and roadworks warnings are sent only for a set of crash attenuators and vehicle-mounted arrow boards with the required communication equipment.

When available, the SRTI feed is able to share information regarding the whole road network. However, the challenges for sharing this data are both availability of information, as well as knowing when a warning should be deactivated. For many use cases, there is no ground-truth, so it is unknown what percentage of events is shared through the SRTI feed. Many initiatives are taking place to further open up these types of data. For example, within the Safety Priority Services (SPS) and C4Safety projects. SPS has implemented several safety related use cases, such as in-car "Emergency Vehicle Approaching" and "Jam Tail Warning" notifications. These notifications are shared with drivers through multiple service providers. The C4Safety project aims to increase safety during roadworks and road inspector interventions on all motorways by implementing automated in-car warnings for these situations. While SPS is in the stage of evaluation, C4Safety is under development.

The Netherlands has, based on the Multiparty Agreement[4], is part of the 'Data for Road Safety' Safety Related Traffic Information Ecosystem. In this ecosystem, the partners share their common understanding of implementing the Delegated Act 886/2013. The discussions go beyond the scope of the Delegated Regulation, by setting up an agreement in which not only the end-user receives these services free-of-charge, but a whole system is built around free-of-charge safety related data exchange based on reciprocity. The aim is to increase the availability and the reach of safety-related traffic information and to commodify it.

Similarly as for the RTTI, no active testing, assessment and/or enforcement activities took place between 2023 and 2024. Currently the RDW acts as National Body and is responsible for compliance assessment for the SRTI delegated regulation. In consultation with the Ministry, the

[4] MPA Data for Road Safety

RDW passively fulfils this responsibility. In 2018, we formally communicated to the Commission—specifically to DG MOVE under Claire Depre—that the Netherlands strongly advocate for a unified European enforcement approach. Concerns were expressed that, without clear guidance and harmonised efforts across the EU, it would be both undesirable and counterproductive for a single Member State to initiate legal proceedings against these global industry players—especially considering that many of them do not primarily operate within the Netherlands. In view of the Netherlands, momentum on this front remains insufficient, and it is respectfully suggested that NAPCORE and other Member States now play their part in advancing this matter.

2.3.5 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)

Regarding 2013/885, no substantial improvements have taken place since the progress report of 2020-2023. The NTM operates the database and geographical dashboard with truck parking information from which service providers and other users can search the metadata of all truck parking areas. The database includes information on:

- 322 parking areas with 8,139 freight parking lots.
- 90% are registered in the NAP (100% public parking areas managed by Rijkswaterstaat, some private areas are still missing with an unknown amount of other public and private parking places).
- 7 parking areas (2.2% of the total) also provide dynamic information. This number is growing, because NDW is working together with the Province of South Holland (as secretary of the Working Group Truck Parking) and Rijkswaterstaat to provide dynamic information about more truck parking sites.

Similarly as for the RTTI and SRTI, no active testing, assessment and/or enforcement activities took place between 2023 and 2024. Currently the RDW is responsible for compliance assessment for the SSTP delegated regulation. In consultation with the Ministry, the RDW passively fulfils this responsibility.

2.4 Priority area IV. ITS services for cooperative, connected and automated mobility

2.4.1 Description of the main national activities and projects

Following the new definition of the ITS directive: "Cooperative Intelligent Transport Systems (C-ITS): Intelligent transport systems that enable ITS users to interact and cooperate by exchanging secure and trusted messages, without any prior knowledge of one another and in a non-discriminatory manner, as established in the recently revised ITS Directive." The Netherlands does not have any active C-ITS project ongoing and on its roadmap. In simple terms, the term C-ITS implies the existence of a technical trust network. In its absence—such as within Safety Priority Services or Data for Road Safety—the term C-ITS does not apply.

The following CCAM activities and projects will be highlighted in this section:

- DITM, focusing on developing a system architecture for digital infrastructure, including critical core technologies related to localisation, traffic services, digital maps, and charging infrastructure;
- MODI, which aims to accelerate the introduction of highly automated freight vehicles through demonstrations, and by overcoming barriers to the implementation of automated transport systems and solutions in logistics;
- SmartwayZ.NL, which is a strategic programme for the South of the Netherlands focused on accessibility founded in 2016.

Digital Infrastructure for Futureproof Mobility (DITM)	
Stakeholders	Funded by the Ministry. Project partners are TomTom, VDL Enabling Transport Solutions, VDL Steelweld, Heliox Automotive, TNO, NXP, AIIM, Sioux Technologies, Monotch, Geomaat, Siemens, Eindhoven University of Technology, Scholt Energy, Stichting ElaadNL, RAI Automotive Industry NL, Brainport Development, Infiniot, Nederlands Kennisplatform Laadinfrastructuur
Status	In progress
Timescale	October 2022 – October 2026
Resources	The project involves an investment of 60.7 million euros. The requested contribution from the National Growth Fund (NGF) amounts to 30 million euros. The partners will co-invest the remaining amount, with 19 million euros funded by private partners, 11.5 million euros by knowledge institutes, and 0.2 million euros by public partners.
Objectives:	
The innovation project "Digital Infrastructure for Futureproof Mobility" focuses on developing a system architecture for digital infrastructure, including critical core technologies related to localisation, traffic services, digital maps, and charging infrastructure. This accelerates the implementation of scalable CCAM and the essential connection to a reliable and secure energy supply. From a DITM perspective, "scalable" means that the reference architecture should scale 1-1 from the NL to the EU context. This scalability is built into the development of DITM's key enabling technologies. Each technology (automatic bus integration, Energypod Battery Energy Storage System, high-definition map, mobile mapping integration, Sensor Derived Observations for HD Maps, validation lab) requires potential EU-wide deployment for future large-scale business models. DITM contributes to definition and standardisation through its deliverables, such as the envisioned reference architecture. Additionally, DITM translates and integrates European developments (e.g., C-Roads Interchange implementation) to the Netherlands. To validate the scalability of the architecture, a number of use cases are developed, tested, and validated in a real and virtual validation environment. In order to achieve interoperability and upscaling, DITM provides an integrated public-private approach, in which developments from the	

(international) automotive industry, ICT industry, traffic management, and mobility innovation are combined.

By leveraging digitalisation and automation, DITM contributes to addressing significant societal challenges concerning safe, reliable, efficient, and sustainable mobility and energy systems. The project facilitates accelerated knowledge and product development, enabling Dutch companies like TomTom, NXP, VDL, and Heliox to strengthen their leading positions in the value chain. The project activities align with the long-term strategies and research and development roadmaps of the involved companies and are crucial for their future competitiveness.

Milestones and impact:

Up till now, many project deliverables are completed. A brief overview is presented below:

- The project was promoted to the outside world via social media and events.
- A first version of the aligned public-private vision on a future "Smart and Green" mobility system and the Transition Paths-Action agenda were drafted.
- A vehicle and safety architecture design was created With focus on developing key technologies such as communication, localization, path and motion planning control, teleoperation, vehicle homologation, and digital twinning. Multiple use cases using these key technologies were developed, such as yard manoeuvring, teleoperation and platooning GLOSA.
- The design for an EnergyPod, which is a crucial link between the autonomous electric vehicle and the environment, has been completed. For the congestion management system, an important component, a design has been created through a collaboration of the partners. Finally, in relation to the EnergyPod, a proof of concept for post-quantum cryptography has been developed.
- A minimal viable part of the digital infrastructure system that facilitates end-to-end ISA and lane navigation use case realization has been developed. These use cases seamlessly integrate in-vehicle infotainment functionality. Recently, the digital infrastructure has been further enhanced to support ISA with C-ITS messages from the C-Roads interchange and lane-navigation use-cases tailored for next-generation vehicles.
- To support CCAM research and development an architecture for the Validation lab has been designed. A Data Sharing Ecosystem, including tooling for use case development, validation, and operation has been developed. To investigate the effects of CCAM on traffic and societal levels, simulation platforms and tooling have been built, including digital twin data models of the Eindhoven Region. To validate the project's CCAM use cases, test vehicles have been prepared and used for development.

MODI	
Stakeholders	The consortium includes industrial partners, industrial clusters & networks, terminals and harbours, public partners, knowledge institutes and test sites. Dutch stakeholders are: DAF Trucks, Technolution, TNO, Ministry of Infrastructure and Water Management (Rijkswaterstaat), Eindhoven University of Technology, HZ University of Applied Sciences
Status	In progress
Timescale	October 2022 – March 2026
Resources	27,992,880.00 euros, including 23,030,095.00 euro EU-contribution

Objectives:

The EU-funded MODI project aims to accelerate the introduction of highly automated freight vehicles through demonstrations, and by overcoming barriers to the implementation of automated transport systems and solutions in logistics. The logistics corridor from the Netherlands to Norway has been chosen for demonstration activities, since the Netherlands, Germany, Denmark, Sweden, and Norway are expected to be amongst the first movers to implement fully automated vehicles in Europe.

MODI comprises of five use cases, each describing a part of the logistics chain in confined areas and on public roads. It identifies what is already possible for automated driving without human interaction and what has yet to be developed. The MODI objectives are to:

- Implement new CCAM technology.
- Define recommendations for the design of physical and digital infrastructure.
- Demonstrate the local, national and international differences and similarities regarding rules and regulations, as well as infrastructural characteristics related to freight transport with CCAM vehicles, both in confined areas and on public roads.
- Cooperate and co-create with logistics companies, road operators, OEMs, providers of physical and digital infrastructure and other stakeholders to bridge the gap between research and development and market introduction.
- Demonstrate innovative and viable business models for connected and automated logistics.
- Perform technical and socioeconomic impact assessments.
- Develop highly automated driving solutions for long-distance operational design domains (ODD).
- Prove that the technology can soon deliver on promised benefits at relatively high speeds and medium traffic complexity, including a coordinated CCAM system to support smart traffic management.

Major challenges include regulatory aspects and standardisation, border crossings, access control, charging, coordination with automated guided vehicles, loading/unloading and handover from public roads to private roads in confined areas. The ambition of MODI is to take automated driving in Europe to the next level by demonstrating complex real-life CCAM use cases and setting examples of CCAM integration in logistics.

The main focus of the Dutch partners in this project is aimed at a coordinated CCAM interface and optimal physical and digital infrastructure.

Milestones and impact:

September 2023 – The Evaluation framework for the to be demonstrated use cases are ready, providing a solid base for building more knowledge on automated transport.

October 2023 – Project deliverables on requirements of users and stakeholders regarding safety /security and border processes are finished. These deliverables provide guidance for the further development of automated freight transport.

September 2024 – The optimal design of physical and digital infrastructure for automated driving in confined areas are described, as well as the first adaptations to the vehicles for automated driving. The description of the optimal design of the infrastructure in MODI will contribute to the international alignment of the design of the confined areas for automated operation.

In 2025, MODI will focus on a significant milestone: the implementation of optimisations to both the physical and digital infrastructure at the Rotterdam site and other MODI locations. This includes conducting demonstrations at these sites.

SmartwayZ.NL	
Stakeholders	The programme is a collaboration between the Ministry of Infrastructure and Water Management, the Province of North Brabant, and the Province of Limburg. For specific projects in collaboration with entities such as the Ministry of Housing and Spatial Planning, municipalities, and private parties, additional agreements are made.
Status	In progress

Timescale	2026 - 2027
Resources	Predominantly public funding

Objectives:

SmartwayZ.NL has been the strategic programme for the South of the Netherlands focused on accessibility in the past eight years. The programme contributes to regional coordination and comprehensive collaboration with the national government. At the end of 2023, a strategic reorientation was conducted, leading to a refinement of the programme.

The dimensions of broad prosperity form the basis for further concretisation of the goals and target values of SmartwayZ.NL:

- Living environment and accessibility: fewer movements, inclusive movements, and efficient movements
- Safety: safe movements
- Health: healthy and clean movements

Large-scale infrastructural projects such as the A58 and A67 have been paused due to nitrogen issues and other reasons. Solutions are currently being studied. The focus until 2027 includes:

- An integrated multimodal agenda: We have established an integrated multimodal agenda that aligns with the urbanisation efforts underway in the South of the Netherlands.
- Approach for paused infrastructural projects: An approach has been developed to mitigate the consequences of pausing several large infrastructural projects. In urban regions and small centres affected by these pauses, an alternative approach is being implemented.
- Contribution to broad prosperity and mobility transition: We have demonstrably contributed to broad prosperity and accelerated the mobility transition.
- Available knowledge and tools: For the South of the Netherlands, we provide shared knowledge, expertise, and tools to support the mobility transition.
- High network organisation rating: We aim for a minimum rating of 8 for our network programme.

SmartwayZ.NL defined the following goals, indicators, and targets for the South of the Netherlands compared to 2024 as baseline, however, it is important to note that various external factors, beyond the influence of SmartwayZ.NL, affect mobility in the South of the Netherlands and therefore the movements. These factors include population growth, economic conditions, fuel and energy prices, housing development, and the climate crisis.

- Reduced Movements: By the end of 2027, there will be a 5% increase in remote working compared to 2024.
- Safe Movements: We aim for zero traffic fatalities, with a yearly decrease in the number of traffic deaths. By the end of 2027, travellers should perceive their journeys as (socially) safe, rating them at least 8 out of 10.
- Healthy and Clean Movements: By the end of 2027, 3% of car movements will have shifted to active and sustainable mobility forms (walking, cycling, public transport) compared to 2024 (modal shift).
- Inclusive Movements: By the end of 2027, travellers will be 10% more satisfied with the quality of the infrastructure and services for cycling, walking, and public transport compared to 2024.
- Efficient Movements:
    - Duration and distribution of traffic jams: The percentage of roads with more than 2 hours of congestion during morning and evening rush hours will be reduced by 5% by the end of 2027 compared to 2024.
    - By the end of 2027, 10% of traffic will have shifted from peak to off-peak hours compared to 2024 (roads and railways).

Milestones and impact:

The following projects have concluded:

- AI Situational Awareness
- AI New Mobility

- Buurautonoom (including a study on shared car usage) *
- Cycling platoon module (Fietspelotonmodule) iTLC *
- Smart Roads *
- Animal detection in-car *
- "Slim Sturen" use case logistics *
- ISA Retrofit

*****These projects were evaluated

The following projects are currently underway:

- Social INnovation to FOster iNclusIve cooperatIve, Connected and Automated mobility (SINFONICA)
- Fabulos phase X
- Updating iTLC to new software versions, setting up data chain management, as well as development of the prioritisation use cases as part of the national developments.

The following projects will (provisionally) start in the near future:

- Interreg Flemish – Netherlands CCAM Proving Region (provisional to the decision of the Interreg, samenwerking in Flemish – Netherlands Consortium)
- GLOSA continuation (provisional)
- CAT4YARDS (project TNO)
- ISA phase 3 (data validation loop) (provisional)
- Traffic management, data and bike (provisional)
- Road score

2.4.2 Progress since 2023

The Netherlands is preparing Connected and Cooperative Automated Mobility (CCAM) through multiple innovative initiatives. MODI is preparing for implementation of the necessary optimisations to both physical and digital infrastructure at the Rotterdam site and other locations as preparation for their demonstrations of the developed design of both types of infrastructure for automated freight vehicles. Meanwhile, DITM is working on a system architecture for the digital infrastructure, aiming to accelerate the implementation of scalable CCAM and to establish an essential connection with a reliable and secure energy supply.

2.5 Availability and accessibility via NAPs of data types listed in Annex III to Directive 2010/40/EU

Calculation principles:
* For static information: based on length divided by total length in kilometres. The total length is the length of the network on which underlying information exists, e.g. speed limits apply (almost) everywhere, but access conditions for tunnels apply only to (the length of) tunnel sections.
** For dynamic/temporary information: availability of data refers to the ability to make the data available and accessible in a machine-readable format on a certain percentage of the network, whenever the underlying information exists / appears, based on the length of the network with this capability divided by total length in kilometres.

2.5.1 Data relating to the provision of EU-wide road traffic information and navigation services

Static information for many of the data types is available for the entire public road network. Important to note, is that, while often information is present for the whole network, it does not mean that the information is always accurate in all its aspects. Real-world conditions are subject to change and processes to adjust information are not implemented everywhere. For example, road authorities are responsible for adjusting information in the National Road Database (NWB) through a dedicated mutation tool called George. The application is still relatively new and expertise and time to adjust information is not always available. Accuracy can also be time dependent, as is the case for roadworks information, which must be entered into the MELVIN application two weeks prior to the start of the roadworks. Activation of dynamic information on roadworks for the complete road network operated by Rijkswaterstaat is performed by the related traffic management centre. The Netherlands established a broad foundation for data availability. This foundation allows the next steps in setting up structural quality assurance for the data items needed for priority information services.

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
1. Data relating to the provision of EU-wide road traffic information and navigation services:				
1.1 Category: Static and dynamic traffic regulations, where applicable, concerning:				
1.1.1 Subcategory: - access conditions for tunnels - access conditions for bridges - speed limits - overtaking bans on heavy goods vehicles - weight/length/width/height restrictions	The trans-European core network for roads And The comprehensive trans-European network for roads, other motorways and sections of primary	access conditions for tunnels*	*100%*	*Available through the traffic sign database, as well as the GLBHA+CO7 feed*
		access conditions for bridges*	*100%*	*Available through the traffic sign database, as well as the GLBHA+CO7 feed*
		speed limits*	*100%*	*Available through the Maximum Speeds feed*
		overtaking bans on heavy goods vehicles*	*100%*	*Available through the traffic sign database*

	roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)	weight/length/width/height restrictions*	*100%*	*Available through the traffic sign database, as well as the GLBHA+CO7 feed*
Subcategory: - one-way streets	*Road infrastructure in the cities at the centre of each Urban Node*	one-way streets*	*100%*	*Available through the traffic sign database and national road database*
Subcategory: - freight delivery regulations	*Road infrastructure in the cities at the centre of each Urban Node*	freight delivery regulations*	*0%*	*Not directly available at the NAP.*
Subcategory: - direction of travel on reversable lanes	*The core and comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)*	direction of travel on reversable lanes*	*0%*	*Not directly available at the NAP, although this information can be derived from information in the MSI feed at the NAP.*
Subcategory: - traffic circulations plans	*The core and comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)*	traffic circulations plans*	*0%*	*TCPs in form of scenarios are digitized within the Diego application. These are not publicly available at the NAP.*
Subcategory: - permanent access restrictions	*The core and comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)*	permanent access restrictions*	*100%*	*Available through the traffic sign database and national road database*

Subcategory: - boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones	*The core and comprehensive trans-European network for roads, other motorways and sections of primary roads, where the total annual average daily traffic is more than 8 500 vehicles, and all roads in the cities at the centre of each Urban Node (if applicable limited to > 7 000 vehicles/day)*	boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones*	*100% (environmental / zero-emission zones)* *0% for other restrictions*	*Available through the environmental zones and zero-emission zones feed.* *This information is available at NWB, but not at the NAP (yet)*
1.2 Types of data on the state of the network:				
Subcategory: - road closures - lane closures - roadworks	*The trans-European core and comprehensive network for roads*	road closures**	*100%*	*Through the "verkeersberichten" feed for all roads in the TEN-T core network.*
		lane closures**	*100%*	
		roadworks**	*100%*	
Subcategory: - temporary traffic management measures	*The trans-European core and comprehensive network for roads*	temporary traffic management measures**	*100%*	*The "verkeersberichten" feed contains road and lane closures, information from road operators and other temporary measures.*

2.5.2 Data relating to information and reservation services for safe and secure parking places for trucks and commercial vehicles

Data type	Geographical coverage	% of parking places for which data are available		Comments
2. Data relating to information and reservation services for safe and secure parking places for trucks and commercial vehicles:				
Category: static data *Subcategory:* - static data related to the parking areas - information on safety and equipment of the parking area	*The trans-European core network for roads*	static data related to the parking areas	*92%*	*The dataset does not fully cover all truck parking spaces (322 out of 350), but includes several private parking locations around the TEN-T network, supplemented by all truck parking areas managed by Rijkswaterstaat.*
		information on safety and equipment of the parking area	*92%*	
	The comprehensive trans-European network for roads	static data related to the parking areas	*92%*	
		information on safety and equipment of the parking area	*92%*	
Category: dynamic data *Subcategory:* - dynamic data on availability of parking places including whether a parking is: full, closed or number of free places which are available.	*The trans-European core and comprehensive network for roads*	dynamic data on availability of parking places including whether a parking is: full, closed or number of free places which are available.	*0%*	*This information is not available at the NAP. It is available for a limited set of parking lots at NDW*

2.5.3 Data on detected road safety-related events or conditions relating to road safety-related minimum universal traffic information

For dynamic or temporary safety-related events, the challenges are both availability of information, as well as deactivation of notifications. For many use cases, there is no ground-truth, so it is unknown what percentage of events is known in the system. Warnings can be issued through the dedicated feed for the whole road network when information is available and verified.

Data type	Geographical coverage	% of geographical scope where data type is available		Comments
3. Data on detected road safety-related events or conditions relating to road-safety-related minimum universal traffic information:				
Category: dynamic data *Subcategory:* - temporary slippery road - animal, people, obstacles, debris on the road - unprotected accident area - short-term roadworks - wrong-way driver - unmanaged blockage of a road	*The core and comprehensive trans-European network for roads and other motorways not included in that network*	temporary slippery road**	*100%*	*When information is available, it is shared through the SRTI-feed for the whole network. The feed is available at NDW and findable at NTM.*
		animal, people, obstacles, debris on the road**	*100%*	
		unprotected accident area**	*100%*	
		short-term road works**	*100%*	
		wrong-way driver**	*100%*	
		unmanaged blockage of a road**	*100%*	
Subcategory: -reduced visibility - exceptional weather conditions	*The core and comprehensive trans-European network for roads and other motorways not included in that network*	reduced visibility**	*100%*	
		exceptional weather conditions**	*100%*	

2.5.4 Static multimodal traffic data for EU-wide multimodal travel information services

**** Where possible, provide figures per scheduled transport mode, referred to in the Annex to Delegated Regulation (EU) 2017/1926 (such as air, rail including high-speed rail, conventional rail, light rail, cableways, long-distance coach, maritime including ferry, inland waterways, metro, tram, bus, trolley-bus)*

Data type	Geographical coverage	% of nodes where data are available for the scheduled transport mode		Comments
4. Static multimodal traffic data for EU-wide multimodal travel information services:				
Category Location of identified access nodes for all scheduled modes, including information on accessibility of access nodes and paths within an interchange (such as existence of lifts, escalators)	*Urban nodes as defined in Article 3, point (p), of Regulation (EU) No 1315/2013 and listed in that Regulation, including those administered by the cities*	Location of identified access nodes for all scheduled modes, including information on accessibility of access nodes and paths within an interchange (such as existence of lifts, escalators)***	For train, tram, bus, metro and watertaxi 100% For ferries the percentage is unkown	*Available at the NAP through the "Haltes- en Stationslocaties" dataset.* *Six ferry lines are included in the database. The Netherlands counts many small ferry lines for which an overview is given on veerponten.nl*
	The entire transport network of the Union	Location of identified access nodes for all scheduled modes, including information on accessibility of access nodes and paths within an interchange (such as existence of lifts, escalators)***	Unkown	*Only available for the Netherlands and some stops that are operated with cross-border public transport in Belgium and Germany*

2.6 Availability of services listed in Annex IV to Directive 2010/40/EU

2.6.1 Road safety-related minimum universal traffic information services

Service	Geographical coverage	% geographical scope covered
Road safety-related minimum universal traffic information (SRTI) service	The ***core and comprehensive*** trans-European network for roads	100%

The SRTI feed is available at the NAP, when data is available, services can be provided for the whole road network as reported in 2.3.4.

3 Key Performance Indicators (KPIs)

This chapter provides information on the requested KPIs. Annex II of the template for this report mentions multiple geographical scopes:

- Core, extended and comprehensive TEN-T (without urban nodes) + motorways;
- Urban nodes from TEN-T + primary roads;
- Entire road network.

The Netherlands has assigned the whole public road network as the primary road network, which results in strong similarities between the second and third levels. Furthermore, the decision was made to report on the broadest possible geographical scope. For these reasons, three geographical scopes were defined:

- Scope 1: Core, extended and comprehensive TEN-T (without urban nodes) + motorways;
- Scope 2: Scope 1 + Urban nodes from TEN-T;
- Scope 3: Entire public road network.

Since the goal is to report for the largest network possible, scopes were chosen to be cumulative.

The length in kms of these geographical scopes was defined by use of the National Road Database (NWB) with a scope-specific filtering.

- **Scope 1** is defined by selecting all motorways (category "autosnelweg"), as well as the N33 and N69. Some TEN-T roads contain roads towards city centres, these roads were not included. This resulted in a total of 6,967km of road for scope 1.
- **Scope 2** contains regional roads (categories "autoweg" and "regionale weg"), as well as main roads within the administrative boundaries of the Urban Nodes as listed in the TEN-T regulation (category "stadshoofdweg"). Scope 2 also includes roads in scope 1. This resulted in a total of 15,054km of road for scope 2.
- **Scope 3** includes all public roads accessible for vehicles from the database. This excludes bus, bicycle and pedestrian lanes, as well as emergency passages (categories "busbaan", "fietspad", "voetpad", "CADO", "ruiterpad", "fietsveer", "voetveer", "vliegverkeer", "voetgangersgebied"). This resulted in a total of 283,285km of road for scope 3. All scopes are visualised in Figure 1.

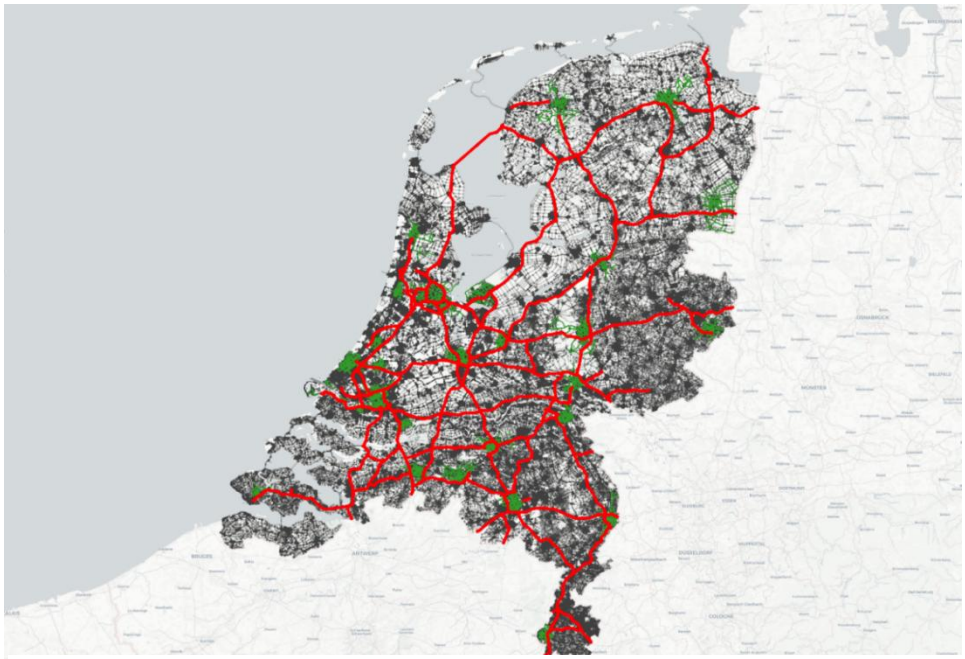

Figure 1: Three different levels of geographical scopes. Scope 1 = red, scope 2 = green, scope 3 = black

3.1 Deployment KPIs

3.1.1 Information-gathering infrastructures / equipment (road KPI)

This KPI is split between two services: traffic monitoring (Floating Car Data, inductive loops, radar, etc.) and weather and environmental conditions monitoring (Emissions monitoring, fog monitoring, etc).

Traffic monitoring

Information gathering infrastructure for traffic monitoring is deployed for 100% of the public road network, covering 100% of each of the geographical scopes. Information is gathered through physical infrastructure and through floating car data. Due to the extensive availability of FCD, the coverage of most local roads is also complete. However, on less-travelled roads, data availability can be inconsistent, primarily due to the absence of an FCD source and privacy considerations.

The NDW procures FCD. Since February 2018, travel times and vehicle speeds have been measured, which is provided as open data. 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.

Weather and environmental conditions monitoring

Information gathering infrastructure for weather and environmental conditions…

The national slippery road notification system (GMS), which is managed by Rijkswaterstaat, covers the whole road network. Around 330 GMS stations measure, among other things, the road temperature. This data is combined with data from The Royal Netherlands Meteorological Institute (KNMI) to predict potentially slippery roads on a regional basis. When there is a risk of slipperiness, road authorities salt both roads and cycling paths. Information is shared on a map through the following website: Strooikaart | Rijkswaterstaat. This information is not available as open data. Other measured environmental conditions, although on a much smaller scale, are fog and wind, with respectively 14 and 2 measurement systems dedicated to road-related measurements (i.e. many more wind sensors are managed by Rijkswaterstaat in context of ports).

The National Institute for Public Health and the Environment (RIVM) is responsible for monitoring air quality in the Netherlands. Their sensor network, combined with two regional measurement networks, covers the entire Netherlands. However, emissions from traffic and transport are estimated through use of vehicle registrations and driven kilometres.

3.1.2 Incident detection (road KPI)

Incident detection in the Netherlands is performed by a number of systems: Automated Incident Detection (AID), crowdsourcing, the National Dispatch Centre (LCM), eCall and bCall.

The AID is present on motorways with signalling systems. The system detects congestion, which often indicates underlying incidents, and reports automatically to the related traffic control centre. Furthermore, crowdsourcing of incidents is performed through several navigational applications. This information can be received for the whole road network but heavily depends on availability of information. The same is true for notifications from drivers calling the National Dispatch Centre.

In addition, about 300 road inspectors are deployed to monitor the road situation and to provide assistance in case of incidents. Additionally, a set of organisational and financial agreements applies to all stakeholders involved, such as Police, Ambulance, Fire Brigade, insurance companies, salvage crews, etc. For instance, towing companies receive compensation for being on standby at crucial locations along highways.

Incident detection is possible for the entire road network through a combination of systems. For this KPI it was chosen to define the network equipped with ITS to detect incidents as the road network on which a notification of an incident will activate incident management measures. This network is defined by the Dutch Incident Management Foundation (SIMN). The foundation has defined this road network in a shapefile. This shapefile was compared with the earlier defined geographical scopes, which led to the following results:

- Scope 1: 100% covered by incident detection;
- Scope 2: 58% covered by incident detection;
- Scope 3: 6% covered by incident detection.

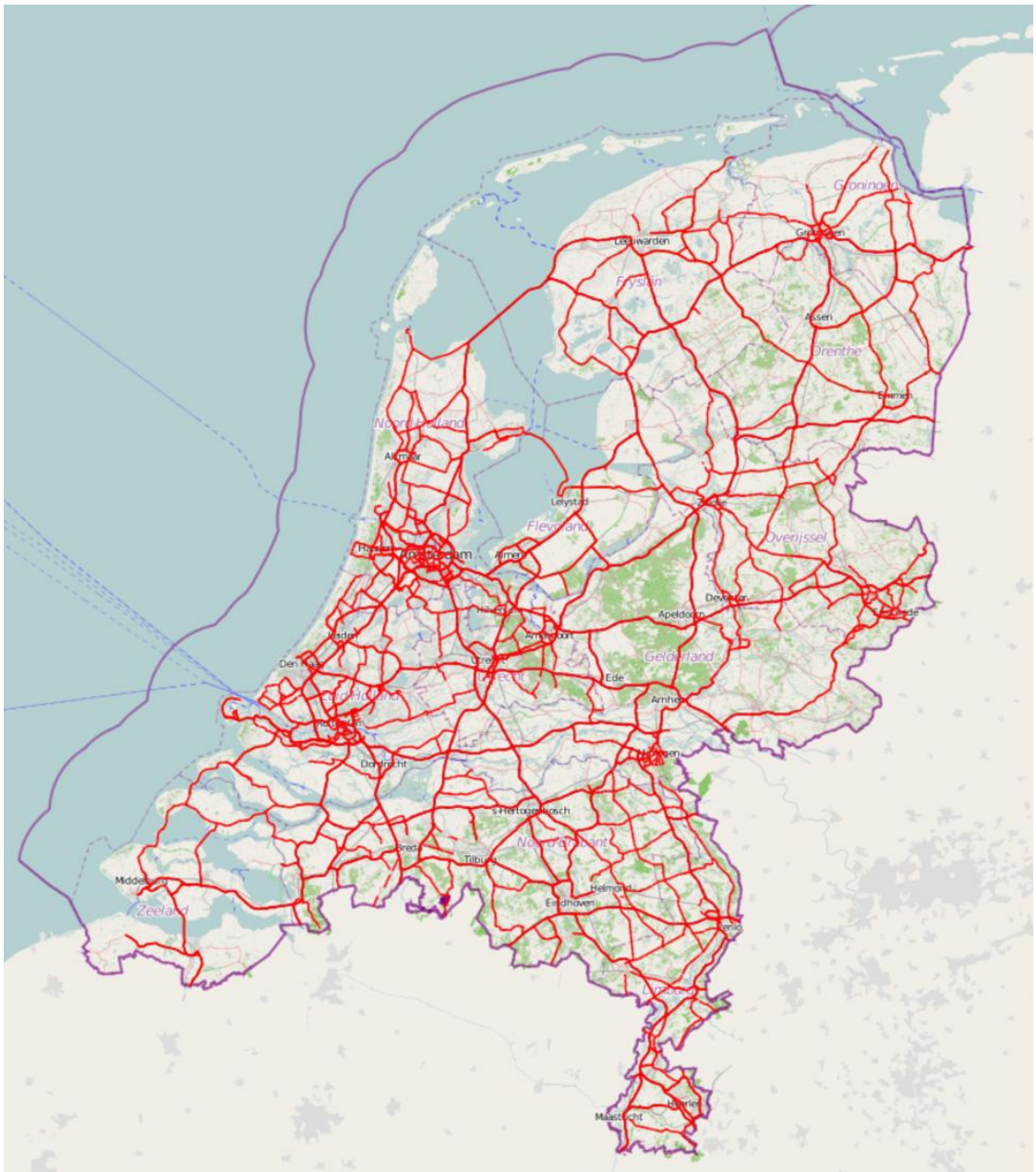

Figure 2: The Incident Management network shared by the Dutch Incident Management Foundation (SIMN)

3.1.3 Traffic management and traffic control measures (road KPI)

Dutch road authorities cooperate on traffic management, as traffic does not stop at the administrative boundaries. Therefore, adjacent road authorities have agreed upon a network for regional traffic management, this is called the Regional Traffic Management (RVM) Network. The shapefile of the RVM network is used as a reference network for this KPI, which gives the following results:

- Scope 1: 99.5%
- Scope 2: 74.9%
- Scope 3: 12.9%

A significant portion of the motorways is equipped with the Motorway Traffic Management (MTM) system, commonly referred to as signalised motorways. This system, integrated with traffic management centres, informs road users through 6,121 signalling/VMS locations, covering 2,964 km of motorways as the beginning of 2024.[5] Consequently, this results in a 42% coverage of scope 1.

The Dutch road network is, according to the dedicated feed at the NAP[6], equipped with 848 Dynamic Route Information Panels (DRIPs) with the following distribution over each of the defined scopes:

- Scope 1: 375 panels
- Scope 2: 651 panels
- Scope 3: 848 panels

Due to the increase in use of digital travel information services, the number of DRIPs is decreasing. A decision to further phase out DRIPs has been made based on the RWS baseline quality framework and an enhanced DRIP framework. Consequently, a significant decline will be seen in the coming years. The Monitor traffic-related information services reports clear indications that younger drivers make more use of in-car digital information through their smartphone or integrated navigation systems.[7] 52% of younger drivers express a preference for obtaining information from in-car systems rather than roadside information. In contrast, only 35% of drivers aged 65 and older share this preference. Meanwhile, 50% of drivers aged 65 and older indicate a preference for roadside information, compared to 27% of drivers aged between 18 and 35. The remaining respondents reported utilizing both sources of information.

Information on currently presented images on DRIPs is available at the NAP through a dedicated real-time feed. Furthermore, the VM-IVRA programme is deploying the digital version of DRIPs, the Digital Information Beacon (DIB), which enables road authorities to inform road users through multiple service providers.

The Netherlands is actively implementing iTLCs. Approximately 1,465 iTLCs are spread across the country. Primarily existing traffic lights at important and busy intersections have been converted into iTLCs. Currently, 86 authorities have implemented iTLCs, including 29 from the G40 municipalities and 11 of the 12 provinces. The iTLCs are connected to the Urban Data Access Platform (UDAP), which currently make two data-driven services possible: prioritisation of specific

[5] Mobiliteitsfond Rijksbegroting 2025
[6] NTM - Locatietabel & gegevens DRIP's
[7] Monitor wegverkeergerelateerde informatiediensten 2024

target groups, as well as optimisation of traffic through increased availability of information for the iTLC.

3.1.4 Cooperative-ITS services and applications (road KPI)

Following the new definition of the ITS directive: "Cooperative Intelligent Transport Systems (C-ITS): Intelligent transport systems that enable ITS users to interact and cooperate by exchanging secure and trusted messages, without any prior knowledge of one another and in a non-discriminatory manner, as established in the recently revised ITS Directive." The Netherlands does not have any active C-ITS project ongoing and on its roadmap. In simple terms, the term C-ITS implies the existence of a technical trust network. In its absence—such as within Safety Priority Services or Data for Road Safety—the term C-ITS does not apply. The Netherlands therefore scores 0% on this KPI for all requested geographical scopes.

3.1.5 Real-time traffic information (road KPI)

NDW collects real-time traffic data on the public road network from induction loops and FCD. As mentioned in 3.1.1, FCD has (nearly) 100% coverage in each of the three geographical scopes. The data 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 volumes, average speed, current and predicted travel time, vehicle type, incident locations, traffic jams, iTLC data and roadworks. Service providers also utilize their own data to inform road users, maintaining an estimated geographical coverage of 100% as well.

The NTM includes a dataset with real-time safety related information. The dataset includes the nature, cause and residual duration information for, amongst others, extreme weather conditions, incidents, wrong-way drivers, obstacles on the road, approaching emergency vehicles and roadworks. This information is used by service providers to inform road users via multiple channels. This information feed can geographically cover each of the three scopes when information is available.

The VM-IVRA programme allows all road authorities to share real-time information on specific road closures (e.g., tunnels) and announce future road closures. In 2024, these announcements were activated 157 times by local road authorities, reaching a total of 5,2 million people.

3.1.6 Dynamic travel information (multimodal KPI)

The length of the scheduled public transport network can be quantified in various ways. One significant metric is the number of scheduled kilometres. In 2023, buses, trams, and the metro collectively covered 472 million kilometres[8], while trains accounted for 143 million kilometres. Dynamic travel information for these scheduled kilometres is accessible through travel planner apps for 100% of these kilometres.

The Central Stop Database (CHB) contains all PT stops in the Netherlands. Road and stop managers provide multiple characteristics of the PT stops. This data is available at the NAP and is used by information providers in their travel planner apps. The database contains 44,034 available stops for metro, bus and tram. Additionally, there are 398 train stations in Netherlands.[9] Dynamic travel information on scheduled public transport is present for 100% of these stops through travel planner apps. Dynamic information is available on many stops through physical information displays. DOVA manages 9127 displays of an approximated total of 11.300 displays in the

[8] Staat van het openbaar vervoer 2023
[9] Kerncijfers | ProRail Reports

Netherlands. These displays cover an estimated 10,000 stops. While dynamic travel information is available for all scheduled trips, this is not always the case for flexible transport. Availability of this information depends on the on-board equipment of the vehicle.

Accessibility characteristics are automatically verified with the provided information. When a stop complies with all rules, it is indicated as accessible. According to the database, 46% of bus stops are physically accessible, 30% are visually accessible, and 25% are both. For metro lines, the figures are 88% for physical accessibility and 92% for visual accessibility. Regarding tram stops, 70% are physically accessible, and 47% are visually accessible. Furthermore, 95% of train stations are physically accessible, and special assistance for boarding is available at 54% of train stations.[10]

3.1.7 Freight information (multimodal if possible or road KPI)

The NAP contains static information on 322 out of 350 (92%) truck parking areas, the majority of which are rest areas. In addition to general information such as names of truck parking areas and their coordinates, the database contains information about facilities (toilets, water, electricity connections, etc.) as well. Dynamic information on free parking spots is available for 7 of those parking areas.

Static information for logistics often relates to road characteristics, which are available through the National Road Database (NWB). This includes access restrictions and environmental- and zero-emission zones. Road Authorities are able to provide this information through the George Application, developed by NDW. This information can be provided for 100% of each geographical scope.

Fleet managers and truck drivers have access to the same information regarding real-time traffic information, such as incident warnings, travel times and delays, for each geographical scope.

3.2 Benefit KPIs

3.2.1 Change in travel time (road KPI)

There is no information available regarding the impact of implementation of ITS on changes in travel time on the road network. However, the Smart Mobility Monitor reports results of a survey regarding the perceived effects of digital travel and route information on travel time and travel time reliability.[11] More than 70% of respondents report a perceived travel time reduction, 58% reported to be part of congestion less often. Furthermore, 29% reports finding a parking spot earlier than they would have without digital information. Finally, 80% of respondents report increased reliability of their travel time.

To provide results concerning measured travel times on the Dutch road network FCD from NDW was utilised to compute average travel times and average time lost per 10km on the network. The FCD, aggregated to NWB links, was used to calculate the average travel time per 10km during rush hours for each defined geographical scope. Given that the free-flow speed is also available, it was possible to compute the average time lost per 10km as well. Results are presented in Table 1. Please note that traffic volumes have not been taken into account for these results, as these can only be estimated with FCD. Rush hours are between 07:00 and 09:00 in the morning and between 16:00 and 19:00 in the evening.

[10] Staat van het openbaar vervoer 2023
[11] Monitor Smart Mobility 2024

Rijkswaterstaat reports annual statistics on performance of motorways.[12] For 2023, a total 69.3 billion vehicle kilometres are reported, compared to 67.4 billion kilometres in 2022. The severity of traffic congestion, calculated by multiplying traffic jam length and duration, was 19.5 million vehicle kilometre minutes in 2023, compared to 14.3 million in 2023, which gives a 36.1% increase in severity of traffic congestion. In particular, this year it was concluded that traffic jams resulting from roadworks and rush hour congestion significantly contribute to this growth.

Table 1: Average travel time and time lost per 10km of road for each geographical scope

	2023		2024	
	Average travel time (mins) per 10 km	**Average time lost (mins) per 10 km**	**Average travel time (mins) per 10 km**	**Average time lost (min) per 10 km**
Scope 1	6,9	1,2	7,0	1,3
Scope 2	8,7	2,0	9,0	2,1
Scope 3	10,0	3,6	10,5	3,8

Rijkswaterstaat reports annual statistics on performance of motorways.[13] For 2023, a total 69.3 billion vehicle kilometres are reported, compared to 67.4 billion kilometres in 2022. The severity of traffic congestion, calculated by multiplying traffic jam length and duration, was 19.5 million vehicle kilometre minutes in 2023, compared to 14.3 million in 2023, which gives a 36.1% increase in severity of traffic congestion. In particular, this year it was concluded that traffic jams resulting from roadworks and rush hour congestion significantly contribute to this growth.

3.2.2 Change in the number of road crashes resulting in deaths or injuries (road KPI)

There is no information available regarding the impact of implementation of ITS on (a change in) road accidents and injuries. However, SWOV publishes "the state of traffic safety in the Netherlands" annually, which presents general information regarding road casualties and injuries.[14] In 2023, 684 casualties were reported, which is 8% less than in 2022, an estimated 7,400 people were seriously injured in traffic. 39% of deaths and 70% of injuries were cyclists, most often due to crashes with cars. 28% of casualties and 10% of serious injuries were drivers or passengers of passenger cars.

The number of traffic casualties and injuries in the Netherlands is currently showing an upward trend, primarily for cyclists. The long-term increase in the number of serious traffic casualties is partly related to the aging population, infrastructure design and unsafe behaviour.

3.2.3 Change in traffic- CO_2 emissions (road KPI)

There is no information available regarding impact of implementation of ITS on (change in) traffic CO_2 emissions. Statistics Netherlands (CBS) publishes national estimated 26,965M kg CO_2 emissions due to motorised traffic.[15] This is a slight increase compared to the 26,928M kg in 2022.

The public transport sector has shown a downward trend in emissions.[16] National emissions from busses have decreased from 40,000 tons of CO_2 in 2017 to 24,200 tons in 2023 due to the

[12] Rapportage Rijkswegennet
[13] Rapportage Rijkswegennet
[14] De Staat van de Verkeersveiligheid 2024
[15] Emissies naar lucht op Nederlands grondgebied; wegverkeer
[16] Staat van het openbaar vervoer 2023

introduction of zero-emission and biodiesel busses. This trend seems to stabilise when compared to 2022 (23,900 tons). The majority of trains run on electricity for which green electricity is centrally purchased. Only a few train tracks are still operated with diesel trains, as these tracks are not yet electrified, tests are being conducted with batteries that can be recharged on electrified segments of the tracks.

3.3 Financial KPIs

Annual motorway traffic management expenses by Rijkswaterstaat are fairly constant, for 2023 Rijkswaterstaat reported the following costs related to traffic management:

- 5M for regional cooperation for traffic management
- 16M for strategical and tactical framework for traffic management
- 114M for traffic management centres (operational and development)
- 97M for management, maintenance and expansion of traffic management instruments
- 17M for public traffic information, traffic information for private parties and in-car cooperative traffic management

This totals 249 million euros for 2023, aligning closely with previous reports of approximately 250 million euros per year. This figure represents 3.7% of Rijkswaterstaat's total budget for 2023.

To determine the annual public operating and maintenance costs of road ITS (in euros per kilometre covered), the following cost categories were considered: "traffic management centres," "management, maintenance, and expansion of traffic management instruments," and "public traffic information, traffic information for private parties, and in-car cooperative traffic management." This totals 228 million euros for roads managed by Rijkswaterstaat. When divided by the total kilometres within scope 1, this amounts to €32,725 per kilometre.

Appendix 1: List of abbreviations

Abbreviation	In full
AI	Artificial Intelligence
AID	Automated Incident Detection
CCAM	Connected, Cooperative and Automated Mobility
CEF	Connecting Europe Facility
CHB	Central Stop Database
DOVA	Collaboration of Decentralized Public Transport Authorities
DIB	Digital Information Beacon
DITM	Digital Infrastructure for Futureproof Mobility
DMI	Dutch Metropolitan Innovations
DRIPs	Dynamic Route Information Panels
DSM	Digital System for Mobility Data
DS4SSCC	Data Space for Sustainable and Smart Cities and Communities
EC	European Commission
EPIAP	European Passenger Information Accessibility Profile
EU	European Union
FCD	Floating Car Data
GMS	Slippery road notification system
IDEA	Intelligent Data Exchange Alliance
ISA	Intelligent Speed Assist
iTLC	intelligent Traffic Light Controller
ITS	Intelligent Transport Systems
LCM	National Dispatch Centre
Ministry	Ministry of Infrastructure and Waterways
NAP	National Access Point ITS
NB	National Body
NDW	National Traffic Data Warehouse
NeTEx	Network Timetable Exchange
NTM	National Access Point for Mobility Data
NWB	National Road Database
OEM	Original Equipment Manufacturer
PSAP	Public Safety Answering Point
PT	Public Transport
RDW	Netherlands Vehicle Authority
ROMO	The Road Monitor project
RTTI	Real-Time Traffic Information
RWS	Directorate-General for Public Works and Water Management (Rijkswaterstaat)
SIRI	Standard Interface for Real-time Information
SIMN	Dutch Incident Management Foundation
SPS	Safety Priority Services
SRTI	Safety Related Traffic Information
SWOV	National scientific institute for road safety research in the Netherlands
TEN-T	Trans-European Transport Network

VM-IVRA	Traffic Management Information for Route Advice
VMS	Variable Message Sign