EUROPEAN
COMMISSION

Brussels, 11.11.2024
C(2024) 7744 final

ANNEXES 1 to 2

ANNEXES

to the

COMMISSION IMPLEMENTING DECISION

laying down the template including key performance indicators for reporting by the Member States under Directive 2010/40/EU of the European Parliament and of the Council

ANNEX I

Template for the initial report and progress reports

Directive 2010/40/EU Implementation Report 2025 *Sweden*

14 March 2025

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1. INTRODUCTION

1.1. General overview of the national activities and projects

Including national Intelligent Transport Services ('ITS') legislation or strategies, or both.

According to Article 17 of Directive 2010/40/EU on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport (the Directive), the Member States must report to the Commission at regular intervals how they are carrying out the work of introducing the national measures in the priority areas of the ITS Directive. In Sweden, it is the Swedish Transport Agency (Transportstyrelsen) that reports to the commission. The Swedish Transport Administration (Trafikverket) shall, according to the national regulation 2016:383 on ITS, produce the content required for the report. Reporting has taken place in 2014, 2017, 2020 and 2023.

This Report on national activities and projects in Sweden covers the period from 2023 to 2025. The report is organized according to the Directive's Priority Areas and Actions as defined in Article 2, Priority areas, and Article 3, Priority actions.

Within the EU there is the revised ITS Directive 2010/40/EU which aims at a coordinated and uniform introduction and use of ITS inroad transport. The directive is implemented in Sweden through the law (2013:315)[1] and the regulation (2016:383)[2] on intelligent transport systems of road transport.

ITS is defined in the law as systems with information and communication technology applied to road transport, including infrastructure, vehicles and users, traffic management and mobility management, as well as for interfaces to other modes of transport.[3]

Sweden is one of Europe´s geographically largest countries, extending almost 1,600 kilometres from north to south. Its main population centres are in the southern one-third of the country, but its extensive natural resources are spread throughout its entire land area, including the far north above the Arctic Circle. The Swedish Road network consists of 98,500 km state roads, 42,500 km municipal streets and roads, 75 500 km private roads with government grants and a very large number of private roads without government grants, mostly forest roads. Safe, secure, sustainable and effective road transport in combination with other transport modes is vital to Sweden's viability and sustainability.

The overall goal of the transport policy is to ensure a socio-economically efficient and long-term sustainable transport supply for citizens and businesses throughout the country. In addition, the Swedish parliament has decided on a functional goal – accessibility – and a consideration goal – safety and environmental health.

Development of the ITS area is based on technical and digital advances as well as research and innovations that link this to the field of transport. In Sweden, the system for research funding is based on a mixture of a functional principle, which type of activities that are financed, and a sectoral principle where an authority has overall responsibility for the area's mission and delimitation.

Funding for research and innovations within ITS typically takes place via government agencies such as the Swedish Transport Administration (STA), the Swedish innovation agency Vinnova,

[1] https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/lag-2013315-om-intelligenta-transportsystem-vid_sfs-2013-315/

[2] https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/forordning-2016383-om-intelligenta_sfs-2016-383/

[3] https://www.transportstyrelsen.se/sv/vagtrafik/Fordon/its/

The Swedish Energy Agency (STEM) and the Research Council for the Environment, Land Industries and Community Development (Formas).

A large part of ITS research in Sweden is carried out at universities and research institutes around the country where projects often take place in collaboration with authorities and private parties in national triple-helix innovation programmes such as Drive Sweden, Infra Sweden, RISE, CLOSER and ShiftSweden. Swedish authorities also actively participate in European research cooperation.

The Swedish Transport Administration has developed several alternative methods to provide access to static- and dynamic traffic data for road and rail.

- The national access point (trafficdata.se), according to the delegated regulations, has been operational since 2017. It is managed and maintained by the Swedish Transport Administration. According to the regulation, public transport data such as timetables have to be distributed to a database, operated and managed by Samtrafiken AB.
- The National Road Database (NVDB) is a core resource regarding static road data and data on traffic regulations.
- The Swedish Transport Administration buys travel time data from INRIX for the purpose of traffic management and planning, primarily covering the areas around Stockholm, Gothenburg and Malmö.
- Swedish Transport Administration cooperates with contractors to enhance winter maintenance of roads by using vehicle-generated data.

Samtrafiken is a national service development company in the public transport sector which was established in 1993 and owned by 36 different operators.

- Trafiklab.se is a web portal for those who want access to all of Sweden's public transport data. The portal has been in operation since 2011 because of new national regulation for Public Transport. Samtrafiken AB is responsible for Trafiklab. They collect and register static and dynamic public transport data from all regional public transport authorities (RKM) and other transport operators. Samtrafiken is a national service development company in the public transport sector which was established in 1993 and owned by 36 different operators.

In 2018, the Swedish Government launched a national freight strategy. The aim of the strategy is to create improved conditions for efficient, high capacity and sustainable freight transport. The Swedish Transport Administration strategy is to combine and include new digital ITS solutions in road freight transport processes such as planning, maintenance and construction.

In 1997, the Swedish Parliament adopted a long-term goal and strategy for road safety, Vision Zero. The work has yielded results and the number of traffic fatalities in Sweden has been more than halved, at the same time as the volume of traffic has increased dramatically.

During 2024, the Swedish Transport Administration updated the direction with its "Roadmap for digitalised road transport system".[4] The roadmap aims to clarify the current situation and identify current development needs and to show a direction for the work going forward.

The enabling focus areas highlighted in the updated roadmap are:

- physical road infrastructure,
- connection and communication channels,

[4] https://trafikverket.diva-portal.org/smash/get/diva2:1893338/FULLTEXT01.pdf

- forms of data exchange and
- data and information volumes

1.2. General progress since 2023

Summary of progress since previous report:

Decisions on investment projects at The Swedish Transport Administration are to be preceded by a review called the four-step principle.[5] This means that conceivable measures are to be reviewed step by step. The idea is that the fourth step should only be proposed if measures in the first steps are not enough to meet the needs and the most effective solution is chosen. ITS and digitization involve measures of steps 1 and 2 and a goal is to use them to a greater extent within the long-term planning of the transport system. Since the last report, steps have been taken to ensure that digitalisation and ITS measures will have a stronger impact on the planning process. A strategy has been developed to operationalise findings from ITS research projects in the STA long-term planning process (Åtgärdsvalsstudier), presented in the research project DigITS[6].

Information and mobility ITS services

The Swedish Transport Administration is in a process to harmonise provision of static- and dynamic data for road and rail via Data Exchange Portal. The same Interfaces are available for all external stakeholders. These data are provided free of charge with a minimum set of requirements for using the data.

The Public Transport Authorities have improved their technical platforms and interfaces on national and regional level, to provide static, historic and dynamic historical travel and traffic data, free of charge, to service providers.

The public transport sector has actively participated on a regular basis in different community meetings and arranges working meetings with transit service providers three-to-four times a year. From the regional access points in Stockholm and Gothenburg, it is possible to obtain static- and dynamic traffic and travel information for public transport authorities. Information on fare and products is highly desired by service providers who wish to develop ticketing functionality in addition to their other transport information services. The regional public transport authorities (PTA:s) are opening up tickets for third party sales. Information about available services can be found at the National Access Point (www.trafficdata.se).

The exchange of static data from various road operators is already coordinated through systems like the National Road Database (NVDB). For dynamic information like accidents and roadworks EU standard DATEX II is used, however, for highly dynamic information such as exact position of snow removal vehicles , the performance requirements for data exchange will be higher than what the Swedish Transport Administration and other road operators currently have the capacity for. Sharing real-time data for the road transport system is a natural next step to investigate in order to understand requirements regarding latency and data quality and how

[5] 1 1 The four-step principle: The first step means that it is to be studied if it is possible to address an identified deficiency by reducing or changing demand. The second step is about identifying more efficient ways of using existing transport infrastructure. The third step includes considering limited renovations and the fourth step entails considering new investments or major renovations. The idea is that the fourth step should only be proposed if measures in the first steps are not enough to meet the needs.

[6] "Steg 1 och 2 åtgärder med fokus på ITS och digitalisering"/"Step 1 and 2 measures with a focus on ITS and digitalization" (Trafikverket, 2024 - in Swedish)

this data could reach and be used by relevant data consumers. A platform where both public and private actors share real-time data has been tested within the Nordic Way project with positive results.

The quality of data in the National Access Point (trafficdata.se) is steadily improving.

Project activities to promote sustainable and competitive alternatives to single car use, such as shared and combine mobility have decreased in number since 2023. In part, this can be explained by challenges around business models, lack of clarity around responsibility and regulations linked to shared mobility services.

During January 2020 to December 2023 the Swedish Transport Administration conducted investigations within a government assignment concerning information and knowledge-raising activities in the field of mobility as a service and shared mobility. This concerned mapping and needs analysis of e.g., digital infrastructure, technical exchange platforms, governance and business models for both mobility actors and travellers.

Travel, transport and traffic management ITS services

Digitization of the transport system creates new opportunities in traditional road management. A number of activities have been finalized or are ongoing.

Examples of ongoing activities in digitalisation field of freight is Sweden's work within the Digital and logistics forum (DTLF) where Sweden/Swedish partners also have taken an active role in the CEF project FEDeRATED. In this project the Swedish partners leads the living labs activities where use cases are started supporting multimodal solutions with a higher degree of data sharing and use of electronic documents (eFTI). The final conference was held November 2023 in Brussels and respectively country/MS presented their results of the living labs (in total 23). Sweden with its 10 Living labs have for the future works consolidated the areas to three (3) fields of focus, Namely Virtual Watch Tower (VWT) concept managing distribution and emission control in supply chains, Rail-CDM (collaborative decision making) leading to increased punctuality and better utilization of infrastructure in railway/intermodal transports and last Sustainable transport hubs for energy/environmental benefits among with efficient intermodal solutions, much driven by data exchange/sharing.

The FEDeRATED living lab "RFID in RAIL" has set up a demonstrator between Sweden and Spain, sharing intermodal transport data and are from 2023 expanding to Norway and border of Denmark. This demonstrator was showed at the European ITS Conference in Lisbon 2023. Another living lab "MMIS" has taken steps to integrate shippers with ports and operators creating visibility in the supply chain and is since 2023 integrated in abovementioned VWT concept.

The organisation of data sharing aspects is directed to the work with European Mobility Data Spaces (EMDS) where Sweden have taken an active role also in participation in projects e.g., deploy-EMDS project. Furthermore, the Swedish Transport Administration also looks into joining EDIC for mobility and are also part of the project MOBIEDIC that started in 2024.

The activities EDIC and eFTI (regulation 2020/1056) applies to the whole EU, and Sweden is active in project initiatives through the Swedish Transport Administration et al.

In 2023 the eFTI (electronic freight documents) took further steps towards acts of implementation and the CEF project eFTI4EU was launched with Sweden lately involved. After preparations starting in 2023 the second eFTI based CEF project was established named

eFTI4ALL with Sweden as the coordinator. In 2023 also preparation for a third mandate of DTLF was prepared and the new membership was in place during the summer 2024.

Today all Traffic Management Centres use data created by travellers and vehicles in the transport network as decision support. Dashboards are available that visualize FCD-based travel times, traffic events from a Waze-feed, etc.

Ongoing projects regarding passenger transport are e.g., Mobile rural areas, which examines in what way multimodal solutions with demand response traffic (DRT) in rural municipalities which includes all available modes of transport can create better service to rural residents with reduced environmental impact. The project Travalytics offers an automated solution to gather and analyse commuting data, helping companies meet Corporate Sustainability Reporting Directive (CSRD) requirements and reduce environmental impact through sustainable commuting options.

Road safety and security ITS applications

Sweden continues to expand the Automatic Traffic Safety Control (ATK – Automatisk trafiksäkerhetskontroll) on major roads without lane separation.

The Swedish automotive industry is working intensively on developing advanced driving support systems for improved road safety, including Cyclist and Motorcyclist Detection, Auto brake for crossing, turning and reversing scenarios, Lane keeping, Driver monitoring, assisted driving etc. for all vehicle types in cooperation with The Swedish Transport Administration.

The SUNRISE-project (Safety assurance framework for connected automated mobility systems) is working until autumn 2025 on defining, implementing and demonstrating the building blocks of this safety argumentation framework: harmonized and scalable methods for safety assessment, procedures and metrics tailored to use cases, a federated framework for a European scenario database and its necessary data interfaces, a commonly agreed simulation framework including tools and interfaces. SUNRISE will work closely with CCAM stakeholders such as policy makers, regulators, consumer testers, user associations and all relevant stakeholders.

In northern Sweden the 5G Edge Enabled Smart Communities for Green Transformation in the North Project (ED5GE) will enable the implementation of a range of smart community applications at four different sites, aiming to enhance public safety and security and improve emergency response times in a port area; improve waste and recycling management in a city area; provide city traffic services for mobility and traffic control; and improve sustainable agricultural practices through smart and precision farming. The project deploys a 5G edge network in Luleå, Boden, Skellefteå and Uppsala.

ITS services for cooperative, connected and automated mobility

Drive Sweden is a national triple-helix cooperation platform and a driver for developing cooperation between all stakeholders in and outside Sweden to be able to establish an eco-system where the vehicle is linked to the transport infrastructure. Vehicle manufacturers and other commercial actors as well as academia and the public sector are active contributors within Drive Sweden.

The Swedish Transport Administration is an active part in the Data for Road Safety cooperation since last year. The goal with DFRS is to establish a common approach for data exchange, focussing on vehicle-generated data for traffic safety services.

Sweden is a member in the CCAM Partnership, which aims at creating more collaborative research, testing and demonstration projects in order to accelerate the pace of innovation and implementation of automated mobility. A goal is to help remove barriers and contribute to acceptance and efficient rollout of automation technologies and services. Swedish Transport Administration and Swedish Transport Agency are members of the CCAM State Representative Group.

The Swedish Transport Administration is continuously working to identify its role in the eco-system and an overall strategy to link the vehicle with the transport infrastructure.

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2. MAIN 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

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

Project/activities	Description
API for dynamic road data	The Swedish Transport Administration has developed an API for dynamic road traffic information for the main Swedish road network. The API has been available since 2014 and is a complement to other national data access points for the dynamic road data that use the DATEX II standard. As of September 2017, data about safe and secure parking is also available from the new API. This access point is used by smaller national actors because of its easy-to-use interface. Traffic flow data and position of road safety cameras (Speed cameras) is available from the interface. A new data feed is developed for provision of dynamic data to Waze and Google maps. Duration: 2014 → Costs: 2 million SEK/yearly, maintenance costs. Data collection is not included in these costs. Road work information, Road works - Dataset - Trafficdata.se
API for dynamic rail data.	An API service for dynamic train traffic information from passenger trains has been developed and released in 2013. From this API it is possible to obtain train timetable data and interchanges. Information about rail-crossings is available from this interface, since beginning of 2020. Duration: 2013→ Costs: 2 million SEK/yearly maintenance costs. Data collection is not included in these costs. Dataset - Trafficdata.se
DATEX II & RDS-TMC for dynamic road data	From 1990, It has been possible to get dynamic road data via RDS-TMC. Since 2000, there is a DATEX interface available for service providers. The users of the DATEX interface are often larger and more established international companies. Since mid-2020, version 3.0 of DATEX II, is up and running. Duration: 2001 → Costs: 3.7 million SEK per year for DATEX and 1,3 Million SEK for RDS-TMC. Data collection is not included in these costs. www.datex2.eu

API for static road and rail data	This API provides Swedish road and rail data available for both private persons and companies. https://trafficdata.se/dataset/Lastkajen and https://trafficdata.se/dataset/resrobot-v21 Duration: 2002 → Costs: 1 million SEK/yearly maintenance costs. Data collection is not included in these costs.
Project on national ticket and payment standard	The national ticket and payment standard (BoB) was jointly developed by thirty industry partners. The first version was published in 2017 and the standard has since then been maintained by Samtrafiken. The aim of the development of the standard is to create opportunities for interoperability, not only between different ticket systems, but also between different components of a ticket system. The BoB-standard enables transport companies to validate their own and others' tickets and sell their own and others' tickets. It also enables third party reseller to resell tickets from transport companies. Samtrafiken supports with expertise for implementation. https://samtrafiken.se/bob/ Duration 2017 → Costs: 5.5 million SEK yearly
ODIN (Open Data in Nordic Countries)	The ODIN project aims to accelerate and coordinate the work necessary to create a unified market within the mobility sector in the Nordic countries. A tangible result from the ODIN project is a joint Nordic NeTEx profile, through which the Nordic countries will achieve both compliance with the requirements in the EU regulation as well as compatibility with critical frameworks such as OpenTripPlanner. The Nordic NeTEx profile is governed by eight members (two from the respective country) who are appointed by each country's transport administration. Open data can be found at https://nordicopenmobilitydata.eu/data/ Duration: 2019-2021 → Costs: 4 million SEK, since 2023 the project has entered a phase where the activity goes from joint development efforts to exchanges of experience without a budget for the collaboration.
Trafiklab	Trafiklab is a community for open traffic data. Trafiklab provides an API-access point for all Public Transport data in Sweden. In conjunction with providing data, Trafiklab and its crew also aim to spur on innovation on open data in general, and Public Transport data specifically. Trafiklab started in 2011 and has since then grown into a go-to-place for knowledge and expertise within the Swedish Open Data scene.

	KODA is a dataset and API created in 2021 by RISE and Vinnova in cooperation with Trafiklab. It aims to provide historic data about public transport, along with tools to learn how to use this data in combination with machine learning. https://www.trafiklab.se/ Duration: 2011 → Costs: 3 million SEK/ yearly maintenance costs.
Data for Road Safety Platform	The Platform is a cooperation between many vehicle manufacturers, service providers and road authorities, to establish a sustainable and scalable way to exchange safety related data between all relevant stakeholders in order to provide safety related end-user services for travelers and to fulfil the goals of the SRTI delegated regulation. Swedish Transport Administration signed the Multi Party Agreement and joined DFRS in September 2023. Duration: 2023 → Costs: 300 000 SEK/year
RTTI Implementation Task Force	Swedish Transport Administration is an active part in the RTTI Implementation Task Force aiming to accelerate the implementation of the RTTI delegated regulation in Europe.
Implementation of enhanced provision of traffic information	Swedish Transport Administration has an ongoing project with the goal to modernize and enhance the provision of traffic information and establish a structured dialogue with the major service providers.
The National Road Database (NVDB)	The Swedish National Road Database (NVDB) is a core database providing national static road data. It should contain all roads in Sweden that are intended and built for motor vehicle and bicycle use (state, municipal and private roads). It also provides geographically positioned road related features such as traffic regulations, administrative and technical information. The Swedish Transport Administration is responsible for NVDB and the maintenance and provision of data. Data collection and ensuring data quality is a collaborative effort between multiple stakeholders, including Swedish Transport administration, municipalities, the Swedish mapping, cadastral and land registration authority and the forest industry. Duration: NVDB is the result of a government assignment that the Swedish Road Administration received in 1996. NVDB was deployed in production 2001. Costs: Yearly data production and maintenance costs are approximately 200 million SEK combined for all stakeholders.

Data from INRIX and Waze	The Swedish Transport Administration acquires travel time data from INRIX for the purpose of traffic management and planning, primarily covering the areas around Stockholm, Gothenburg and Malmö. Swedish Transport Administration is also part of the Waze for cities Program (W4C) in order to get access to incident data in real time Dashboards visualizing, both travel times and incidents are available in all four Traffic Management Centres in Sweden. Duration: 2019 →
KomILand 3.0	Create sustainable travel in rural and small urban areas through combined mobility. KomILand is financed by Region Västra Götaland and Vinnova. https://www.k2centrum.se/komiland-30-forlangt-och-utvecklat-pilotprojekt-0 Duration: 2019 - 2023 Costs: 5.5 million SEK
Freelway	Freelway is a platform that offers payment and booking processes and resource planning within mobility solutions focused on rural areas. Freelway's booking system help optimizing the routes and increase occupancy in vehicles Freelway's app makes it easier for the travellers because all available trips are searchable in the same place. https://www.freelway.com/ Duration: 2018→
EC2B	Integrated mobility services for real estate, https://ec2b.se/ EC2B was developed within the EU-funded project IRIS Smart Cities, where the cities of Gothenburg, Nice and Utrecht tested smart solutions for energy, sustainable transport and open data. Through EC2B, companies and residents get convenient access to packages of mobility services – public transport, loan bikes, car pool, rental car, taxi, carpooling, home delivery, etc. in the property or via common mobility hubs in the area. For property operators, EC2B provides a new service for sustainable, flexible mobility to integrate into the property. With EC2B, fewer car parking spaces are needed. EC2B as a MaaS provider offers the three parts required: physical services, digital services and soft services (communication and nudging). Duration: 2018 →
NOMAD	NOMAD (Nordic Open Mobility and Digitalization) is a research and innovation project, funded by Nordic Innovation, which aims to enable seamless mobility using multiple modes of transport throughout the Nordics. ITS Sweden is one of the partners. The project explores the concept of roaming as a means of inspiring service agreements between MaaS operators, which will benefit individual travellers and businesses, and which will support parallel developments of open data standards in the Nordics. The project will introduce a market enabling framework of technology and business practices for MaaS and other smart mobility services.

	Partners: NOMAD and Nordic Innovation (an organization under the Nordic Council of Ministers with core members: Kyyti Group, ITS Nordics (Norway, Finland, Sweden, Denmark, Iceland), UbiGo, RISE, TOI and Capital Region of Denmark) https://nomadmobility.org/ Duration: 2019 - 2023
Mistra SAMS fas 2	Mistra SAMS phase 2 aims to create future scenarios for a sustainable transport system and provide suggestions on how to strengthen the transformative capacity of public actors in relation to new accessibility and mobility services. Partners: VTI. KTH, K2, Karlstads university, Lunds university, Swedish Transport administration, Stockholms stad, Botkyrka municipality, Ericsson, Sveriges Ingenjörer, Taxiförbundet and Smart Resenär. https://www.sams.kth.se/se/about/mistra-sams-phase-2/mistra-sams-phase-2-2021-2024-1.1311509 Duration: 2021-2024 Costs: 45 million SEK
National Access Point (NAP)	NAP is a service provided by the Swedish Transport Administration where designated actors in the transport sector shall publish their existing travel and traffic data. The ITS Directive's adopted delegated act A requires Member States to provide a national access point and according to the current Swedish regulation, the Swedish Transport Administration is designated responsible. To fulfil the requirements, a national website has been created; www.trafficdata.se. There are 51 datasets from 13 organisations registrered. Duration: 2019 → Costs: 2.6 million SEK annually
NAPCORE	NAPCORE is a EU initiative to strengthen National Access Points (NAPs) as an integral part of the European digital ITS infrastructure. The initiative will also provide national and EU-wide coordination for harmonization and interoperability of the national access points. Germany is the coordinator. NAPCORE | National Access Point Coordination Organisation for Europe Duration: 2021-2025 Costs: 3.76 million SEK for Sweden's part of the project
DyMoN	Provide conceptual and empirical understanding of the potential to combine real-time, user generated and publicly available environmental and transport data with nudging methods to promote sustainable urban mobility behaviours. Examines how effective nudging strategies are designed, while ensuring privacy and inclusion of citizens in smart cities. Partner oganisations: Uppsala university, division of Civil Engineering and Built Environment, Sustainability Innocenter, Ecollective, The University of Salzburg, Traficon.

	https://jpi-urbaneurope.eu/project/dymon/ Duration: 2021-2024 Costs: 3 million SEK
MaaS for Sustainable Cities	Exchange experiences between stakeholders to optimize the benefits of MaaS solutions. The assignment is carried out by VTI/K2 with Drive Sweden as coordinating party. https://www.drivesweden.net/en/project/maas-sustainable-cities Duration: 2021- September 2023 Costs: 2.5 million SEK
DREAMIT 2.0 - Efficient access management	Examines how automated information exchange between trucks can reduce truck waiting times at terminals. DREAMIT 2.0 was performed by nine parties from academia and industry. Partners: Handelshögskolan Gothenburg, Consenso, Volvo Technology, APM Terminals, GDL Transport, Tjörns Bilservice, Vänerexpressen and Tietoevry. https://www.vinnova.se/en/p/dreamit-2.0---effective-access-management/ Duration: 2020-2024 Costs: 10 million SEK
Coordination of business trips by rental car	Create a digital platform where companies can coordinate their business travel. Partners: RISE, Freelway, Europcar, Sandvik and Scania. https://www.drivesweden.net/en/project/coordination-business-trips-rental-car Duration: January 2022 - July 2023 Costs: 2.4 million SEK
Accessible Public transport for special needs - digital accompaniment in complex environments	Increase the accessibility of public transport for people with different disabilities, mainly visual impairments, including through open traffic data and accessible routes. Partners: Gaia, LiU, RISE, VTI, Östgötatrafiken. https://linkopingsciencepark.se/digital-accompaniment-in-public-transport/ Duration: 2021-2023 Costs: 3 million SEK
eSPARK	Compile user patterns of e-scooters and investigate how e-scooters can contribute to a more transport-efficient society. The project was coordinated by Chalmers university of technology. https://www.ri.se/en/what-we-do/projects/espark-assessing-electric-scooters-role-in-fossil-free-transport Duration: 2021- July 2023

	Costs: 6.4 million SEK
MMIS III	MMIS Phase III aims to increase transparency and efficiency in global supply chains by introducing new ways to share and retrieve key logistics data. The reference and demonstration pilot was Alleima's (formerly Sandvik Material Technology) export supply chain of advanced steel products. Partner oganisations: CLOSER, RISE, Alleima, Geodis, Swedish Transport Administration, Swedish Maritime Administration, Swedish/US customs and Port of Gävle. https://www.sciencedirect.com/science/article/pii/S0925527323001457 Duration: 2020-2023 Costs: 5.8 million SEK
Government assignment - Mobility as a service	The Swedish Transport Administration conducted investigations within a government assignment regarding information and knowledge-raising activities in the field of mobility as a service and shared mobility. This concerned mapping and needs analysis of data structures, exchange points and business models for both actors and travellers. In addition to this, the study included a global trend analysis within combined mobility and an overall assessment of what should be the role of the state and the Swedish Transport Administration in the area of combined mobility is reported. https://trafikverket.divaportal.org/smash/get/diva2:1822186/FULLTEXT01.pdf Duration: 2020-2024 Costs: approx. 6 million SEK
Access distance to e-scooters: Analysis of app use and trip data in Stockholm	This study by Kungliga Tekniska Högskolan uses ITS-data to analyse micro mobility patterns. The willingness to walk to a shared e-scooter in the initialization of the trip is an essential part of users' travel behaviour. Studying the point of trip initialization can predict the demand for micro mobility services. Furthermore, the access distance provides input to determine the catchment area for the service. https://www.sciencedirect.com/science/article/pii/S2214367X24001273 Duration: 2024
A Design Framework for Women-Centred Mobility Hub	Combining experiences in Sweden and USA, the project will develop a Design Framework for Women centred Mobility Hubs, co-located centres offering shared mobility options, infrastructure and services focusing on women and caregivers. The goal of the project is to develop a guide for planning, designing, and building infrastructure and services that can lower emissions, address gender-based equity issues and serve the more vulnerable users of transportation. Partner organisations: Living Cities and Communities AB and Shared Use Mobility Center

	https://futuremobility.lindholmen.se/en/project/design-framework-women-centered-mobility-hub Duration: 2023-2024 Costs: 1.0 million SEK
Shared micro mobility systems with Big Data	By using big data, the project will contribute to evaluation methods, empirical data and digital tools for a more effective shared micro mobility service in urban environments. The project aims to develop scalable, data-driven tools for shared mobility service management, offering improved decision support to key stakeholders like government agencies. It also demonstrates innovation by aligning academic expertise from Chalmers and WSP with the practical needs of the City of Stockholm. https://research.chalmers.se/en/project/11228 Duration: 2023-2025 Costs: 1.8 million SEK
Mobility wallet	The project aims to develop and validate a solution for an open, operator-independent mobility wallet system. This wallet will simplify access to shared mobility services for users and make it easier for employers and other actors to manage subsidies and incentives. The solution, based on established technologies from the mobility and finance sectors, seeks to streamline administration, expand service reach, and reduce integration costs for providers. Led by RISE, the project involves partners Benify, Voi, Västtrafik and others. https://www.drivesweden.net/en/project/mobility-wallet Duration: 2024 Costs: 1.0 million SEK
Modular and scalable mobility hub with charging for shared micro mobility	The focus of the project is to create and test a modular and scalable mobility hub that supports charging of the most well-known electric scooter models. The overall goal is to promote shared micro mobility and reduce its environmental impact by increasing accessibility both in larger cities and in smaller towns. Partner organisations: Standab, Anderssons Mekaniska, ID8 Engineering, Tier Mobility & Dott. https://www.drivesweden.net/projekt/modular-och-skalbar-mobilitetshubb-med-laddning-delad-mikromobilitet Duration: 2023-2024
CoMiMo – Connected Micro Mobility	The project is based on a solution that removes the obstacles that exist today for connected, efficient and safe micro mobility. The project creates collaboration and solves needs in the city within home deliveries, micro mobility, mobility hubs and real estate and parking companies through digitization, geofencing and digital support for battery replacement in mopeds and electric scooters.

	Partner organisations: Lunds Universitet, GoCimo, Foodora, Vialumina, Nordstan, Högskolan Borås. https://www.drivesweden.net/projekt/comimo-connected-micro-mobility https://www.vr.se/english/swecris.html?project=2022-03074_Vinnova#/ Duration: November 2022 - 2025
ACCESS	Samtrafiken has a new distribution service that enable sales of combined national travels throughout Sweden. This service connects resellers with all public transport operators in Sweden (currently with the sole exception of Flixbus). This is achieved using the OSDM booking standard. The system has been operational since April 2024. This is a new platform for the old cooperation called ResPlus that has been in place for over 30 years. It is a voluntary cooperation within the industry and financed by the industry without government financing. https://samtrafiken.se/services/national-distribution-system/ Duration: 2022-2024 Operation: 2024-
API for access to tickets from regional PTA	Samtrafiken has two projects to achieve reselling of tickets using the BoB standard. *Connect* is a project to create a national access point for third party reseller to Swedish PTAs. This will enable resellers to sell the different PTAs full offers including period tickets and other products not available in the National Distribution Service (see ACCESS above). This access point will use the BoB standard as reselling API. The project is financed by the participating PTAs. The aim is to lower the costs to resell PTA tickets compared to point-to-point connections. Duration: 2024-2025 *RMVB* (ResPlus Med Validerbara Biljetter) is a project to connect the PTAs various BoB compliant system with the National Distribution Service (NDS, see ACCESS above). Today these are sold with special tickets that is not possible to validate in the PTAs equipment. This project will enable the NDS to retrieve tickets following the BoB standard, which are possible to validate, and deliver them through the OSDM API in the NDS. The project is financed by the owners of Samtrafiken. Duration: 2024-2026
Major Projects and Programs	**Description**
FEDeRATED	The Swedish Transport Administration and The Swedish Maritime Administration as beneficiaries working with federative platforms with the objective to increase efficiency in multimodal transports through increased data

	sharing and use of electronic documents. Work was finalised in November 2023 and transferred to activities in 3 consolidated fields. https://www.federatedplatforms.eu/index.php/living-labs-2 Some living labs have continued under the eFTI projects and activity is linked to establishment of EDIC in the light of European Mobility data spaces where Sweden has an active role.
Europe's Rail	The successor of Shift2Rail and consists of digital approaches in the whole programme but especially in freight and the project TRANS4M-R. Both workstreams consists of digitalisation as an enabler of a more intelligent rail freight concept. Swedish Transport Administration is very active - as founding member - in Full digital freight train operation as well as seamless operations. In seamless operation both the RFID in Rail concept and Rail-CDM concept from FEDeRATED plays an active role with further implementations.
CCAM	*Sweden is a member in the CCAM* Partnership, which aims at creating more collaborative research, testing and demonstration projects in order to accelerate the innovation pace and implementation of automated mobility.
EMDS, deployEMDS	Aligned with the European data strategy and the Sustainable and Smart Mobility Strategy, deployEMDS, a project co-funded under the EU Digital Europe Programme, will support policymaking by enabling data sharing and reuse for efficient multimodal mobility and traffic management, as well as for measuring progress of sustainable urban mobility across Europe. The Swedish Transport Administration as beneficiaries contributes in the policymaking work package led by RISE (Research Institute of Sweden). https://www.vinnova.se/en/p/deployemds-se1-swedish-consortiums-first-year-cofinancing-from-vinnova-/ Duration: Nov 2023-Oct 2026 Costs: In total approx. 180 million SEK, Swedens part approx 8 million SEK per year.
MOBIEDIC	The project aims to establish a common data infrastructure for mobility, to develop a European mobility data space and the advocacy for sustainable data practices. It will support the creation of EDIC (European Data Infrastructure Consortium). The Swedish Transport Administration participates and in parts also RISE. A decision on membership in the EDIC is being prepared.
Drive Sweden	Drive Sweden is a Strategic Innovation Program launched by the Swedish government that gathers the best in the area – from all sectors of society. The

	challenges tackled along the way could pertain to road safety, adaptation of infrastructure and legislation that needs updating. Partners in the program, e.g., Ericsson, Swedish Transport administration, Scania, Volvo Cars Company, Volvo Trucks. In total, Drive Sweden has more than 40 partners. Drive Sweden establishes an open environment for developing cloud services, and that data access and data exchange can be done efficiently, as well as creating data exchange capabilities through open APIs and a library of interfaces and the ability to store data in the cloud. https://www.drivesweden.net/ Duration: 2015 - 2025 Costs: 20 million SEK per year
ShiftSweden	This strategic innovation program started 2024 and brings together the construction and transport sectors to mobilize actors around three shifts: To integrate the built environment and mobility into an ecosystem, to create new values through circular business models, and to create competitive alternatives to individual car travel. https://www.shiftsweden.se/

2.1.2. Progress since 2023

Description of progress in the area since 2023:

Samtrafiken's National Distribution System, was launched on March 5 2024. It is the first system in Europe to embrace the open and international standard OSDM-Online. With this competition-neutral standard, all producers have the opportunity to connect and the system will be connected to several booking platforms.

The system creates opportunities for digitized customer solutions, tickets and validations. This advancement brings significant benefits for travellers: simplifying access, planning, and booking for train journeys with various traffic operators, including competing companies, within Sweden and eventually throughout Europe. With the help of this solution, all public transport providers will be able to make their ticket products accessible and combinable for retailers through the Samtrafiken DISTRIBUTION service. Both producers and retailers will have the ability to access the national product range through the Samtrafiken ACCESS service.

The CoMiMo-project is based on a solution that removes the obstacles that exist today for connected, efficient and safe micro mobility. The project creates collaboration and solves needs in the city within home deliveries, micro mobility, mobility hubs and real estate and parking companies through digitization, geofencing and digital support for battery replacement in mopeds and electric scooters.

The pilot is carried out in Foodora´s regular deliveries with riders on mopeds for 12 months and is compared with today´s production. 20 electric mopeds for food deliveries, as well as 5 beacons in Foodora´s production are included. Real data from the vehicles as well as energy and geofencing data is delivered. A system solution is developed where a unique multifunctional station forms the base - the beacon - to solve crucial challenges. Analysis of data and scalability models for cities in the EU in different scenarios are developed to evaluate the city´s challenges and solutions.

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

Progress made in terms of the accessibility, exchange and reuse of the travel and traffic data types set out in the Annex:

A common process for collection of all public transport travel and traffic data, both static, dynamic and historic data to the access point (Trafiklab.se) for public transport information is agreed with all public transport authorities (PTA) authorities and the public transport operators (PTO).

Trafiklab is a proxy (third party database) where entities can provide data. Metadata from Trafiklab.se are published via the national access point (trafficdata.se). There are no other MMTIS datasets registered on the national access point. A new national technical Infrastructure for collection, storage and publication of data in accordance with EU regulation 2017/1926 (MMTIS) is implemented through a national project during 2018-2023. Due to new formats, standards and extended amount of data, new harmonization solutions have been implemented to be able to use the data in different services.

The process and technical infrastructure for collecting data, and the infrastructure for publication of data is new and adjusted to be compatible with each other. Most data types regarding static and real-time data according to the MMTIS regulation, including historical data, are available in machine readable format from the public transport sector via the national access point. Static data can be collected in NOPTIS- DOI and DII or NeTEx standards. Dynamic data can be collected in both NOPTIS-ROI and SIRI. Static data can be provided in NeTEx and GTFS standard. Dynamic data can be provided in SIRI and GTFS-R. A web based-portal has been developed to help operators to provide data to Trafiklab.se, for those operators who is not able to provide data in a digital format.

Geographical scope of the data set out in the Annex accessible via the national access point, and their quality, including the criteria used to define this quality and the means used to monitor it:

The data quality criteria used are: quality indicator and update frequency. These are mandatory, free text field, documented by the data providers when updating the national access point (www.trafficdata.se) with data and can be seen as a minimum data quality level. For data collection, a new validation tool has been developed and implemented to ensure high data quality for both static and dynamic data.

The geographical coverage of the static travel and traffic data published on Trafiklab, corresponds to the TEN-T network, the urban- and rural transport network and some of the privately operated interlinks between cities are also covered.

Linking of travel information services:

The Implementation of the OJP (Open Journey Planner) standard is handled in collaboration with Samtrafiken and their partners. The implementation of OTP (Open Trip Planner), and to make these implementations OJP ready, is so far only done in the south region of Skåne. Initially, the plan was that both Samtrafiken and Skånetrafiken should implement OTP and OJP in order to exchange information between respective travel planners. Samtrafiken has chosen a

different solution than OTP for its national sales/travel planning, which is why OTP with preparation for OJP has only been implemented by Skånetrafiken.

Results of the assessment of compliance referred to in Article 9:

The Swedish national body has made no compliance assessment solely for holders of data for the Swedish transport network, but has participated in activities on EU-wide compliance assessment in the NAPCORE project.

Where relevant, a description of changes to the national or common access point:

MMTIS has an URL pointing to Trafiklab, which provides data related to public transport and other mobility solutions. Samtrafiken is responsible for collecting and providing this data through Trafiklab, which serves as a platform for developers to access various datasets.

Additional information (e.g. have mobilityDCAT-AP or other metadata catalogues been implemented?):

A metadata catalogue (DCAT-AP) has been implemented. The recently released metadata standard mobility DCAT-AP 1.0.1 is planned to be implemented in the spring 2025 and Sweden is active in the NAPCORE workgroup for metadata standards. Metadata can be registered and data providers are asked to record metadata when publishing sets of data.

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)

Progress made in terms of the accessibility, exchange and reuse of the data types set out in the Annex:

Sweden will use the same primary road network for the (EU) 2022/670 as for the Directive 2008/96/EC. The government has decided on this through an amendment to the national ITS regulation SFS 2016:383.

There are currently 13 organizations and 51 datasets registered on the National Access Point. Since the status report in 2023, three additional organizations, including the Swedish Transport Agency, and two new datasets has been registered.

All data providers offer data types included in the DR 2022/670. Sweden is engaged in NAPCORE and in the clarifying activities stemming from the initiatives taken by ITS service providers, TM 2.0, TISA and others. National projects on how to provide data on regulations and restrictions in a harmonised way for national and local authorities are ongoing, as are several initiatives on how to increase the accessibility and usage of in-vehicle generated data.

Geographical scope of the data accessible via the National Access Point, changes to the primary road network and to the data content of real-time traffic information services and their quality, including the criteria used to define this quality and the means used to monitor it:

The geographical scope of the static data types registered in the National Access Point varies from covering mainly motorways and arterial roads to extended coverage including regional, urban and local roads. The dynamic road status data types and the traffic data types covers motorways and arterial roads, regional, urban and local roads. It is mandatory for the data

providers to declare the quality of the data when they update the National Access Point with data according to the delegated regulation and can be seen as a minimum level for the declaration. Quality criteria for the data to be declared are: 1. quality indicator (description of quality) and 2. Update frequency, the user can choose among predefined update frequencies.

Results of the assessment of compliance referred to in Article 12 with the requirements set out in Articles 3 to 11:

The Swedish national body has made no compliance assessment solely for holders of data for the Swedish road network, but has participated in activities on EU-wide compliance assessment in the NAPCORE project.

Where relevant, a description of changes to the national or common access point:

No changes of the National Access Point have been made since the last report.

Additional information (e.g. what data types are being provided? Have mobilityDCAT-AP or other metadata catalogues been implemented? Are quality requirements being checked?):

The following datatypes categorized as belonging to DR 2022/670 are currently available via the National Access Point:

(1) The types of data on infrastructure:

(a) road network links and their physical attributes:

(i) geometry;

(ii) road width;

(iii) number of lanes;

(iv) gradients;

(v) junctions;

(b) road classification;

(c) location of tolling stations

(d) location of service areas and rest areas;

(e) location of recharging points for electric vehicles and the conditions for their use;

(f) location of compressed natural gas, liquefied natural gas, liquefied petroleum gas stations;

(g) location of refuelling points and stations for all other fuel types;

(h) location of delivery areas. ***Currently not available in NAP.***

(2) The crucial types of data on regulations and restrictions:

(a) static and dynamic traffic regulations, where applicable:

(i) access conditions for tunnels;

(ii) access conditions for bridges;

(iii) permanent access restrictions;

(iv) speed limits;

(v) freight delivery regulations;

(vi) overtaking bans on heavy goods vehicles;

(vii) weight/length/width/height restrictions;

(viii) one-way streets;

(ix) boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones;

(x) direction of travel on reversible lanes;

(b) traffic circulation plans. ***Currently not available in NAP.***

(3) Other types of data on regulations and restrictions:

(a) the location and identification of traffic signs reflecting traffic regulations and identifying dangers:

(i) access conditions for tunnels, ***currently not available in NAP;***

(ii) access conditions for bridges, ***currently not available in NAP;***

(iii) permanent access restrictions, ***currently not available in NAP;***

(iv) other traffic signs reflecting traffic regulations, ***currently not available in NAP.***

(b) static and dynamic traffic regulations, where applicable, other than traffic regulations referred to in point (2);

(c) identification of tolled roads, applicable fixed user charges and available payment methods (including retail channels and fulfilment methods);

(d) variable road user charges and available payment methods, including retail channels and fulfilment methods.

(4) The crucial types of data on the state of the network:

(a) road closures;

(b) lane closures;

(c) roadworks;

(d) temporary traffic management measures.

(5) Other types of data on the state of the network:

(a) bridge closures;

(b) accidents and incidents;

(c) poor road conditions;

(d) weather conditions affecting road surface and visibility.

(6) The types of data on the real-time use of the network:

(a) traffic volume; ***currently not available in NAP.***

(b) traffic speed;

(c) location and length of traffic queues; ***currently not available in NAP.***

(d) travel times;

(e) waiting time at border crossings; ***currently not available in NAP.***

(f) availability of delivery areas; ***currently not available in NAP.***

(g) availability of recharging points and stations for electric vehicles; ***currently not available in NAP.***

(h) availability of refuelling points and stations for alternative fuel types; ***currently not available in NAP.***

(i) price of ad hoc recharging/refuelling, ***currently not available in NAP.***

Metadata catalogues are implemented according to mobilityDCAT-AP.

The quality requirements are currently not checked by the National Access Point, as it is a web portal, and the compliance are depending on the data provider.

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

2.2.1. Description of the main national activities and projects

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

Project/activities	**Description**
DTLF (Digital Transport Logistic Forum) 2.0 and 3.0	Sweden is participating in the work with the Digital Transport and Logistic Forum (DTLF) via The Swedish Transport Administration, Swedish Maritime Administration, Swedish Transport agency and several other Swedish partners (Ericsson, RISE, Lindholmen Science Park and Chalmers). The DTLF forum aims to improve the capability between various stakeholders of using digitalisation as an enabler for efficient and seamless transport within the field of freight.

	DTLF 1.0 mandate was ending in 2018 with two (2) reports from the established subgroups with recommendations for further action. This action list was partly implemented in a CEF call where finally two projects was nominated namely FENIX and FEDeRATED. Sweden participates strongly in FEDeRATED with The Swedish Transport Administration and The Swedish Maritime Administration as beneficiaries. The projects are catalysts for the work in the new mandate of DTLF 2.0 (2018-2023). The third mandate period started in summer 2024 and goes to 2029 and are supporting mainly, but not only, the EDIC/European mobility data spaces and eFTI initiative. DTLF is also a reference group for EDIC establishment and the EMDS related projects deploy-EMDS and MOBIEDIC. Duration: 2018-2023 Costs: 2.3 million SEK
RRTCDM	RRTCDM (Rail Road Terminal Collaborative Decision Making) aims to create more effective collaboration between the intermodal terminal, shipping companies, train operators and truck operators by enabling digital collaboration on forecasting available capacity to increase the fill rate of train commuters. Tests are taking place in Jönköping and Nässjö. The initiative has been consolidated in Europe's Rail seamless operations part under the name Railway-CDM. Duration: 2020-2023 Costs: 3.5 million SEK
Terminal Flow (BetTerFlow)	Terminal Flow (BetTerFlow) aims to streamline the flow of goods between Sweden and Finland via the Wasaline ferry and the transhipment between the port and the Hillskär freight train terminal. Integrated in Sustainable Hubs system and VWT from FEDeRATED. Duration: 2019-2023 Costs:2 million SEK
Sustainable Intermodal Chain (SIMC)	Sustainable Intermodal Chain (SIMC) creates opportunities for information exchange between different roles in the transport chain from the perspective of the transport buyer. Integrated in Sustainable Hubs system and VWT from FEDeRATED. Duration: 2019-2023 Costs: 2 million SEK
Optimized Port Operation (OptiPort)	Optimized Port Operation by Cargo Owner Integration focuses on optimizing Kvarken Port's and Umeå's port operations to meet

	tomorrow's digital logistics solutions based on the needs and requirements of cargo owners. Integrated in Sustainable Hubs system and VWT from FEDeRATED. Duration: 2019-2023 Costs: 1 million SEK
Virtual Watch Tower	The Virtual Watch Tower (VWT) project, cargo owner-driven port-centric, fills a gap in cross-industry collaboration to manage supply chain disruptions by piloting a digital middleware connecting VWTs of various parties in a system-of-systems to easily share, aggregate and compute data supporting actors, such as cargo owners and ports to build collective intelligence and collaborate globally at scale. The digitally powered networked solution will contribute to the overall digitalization of the maritime industry making supply chains more efficient. Project is coordinated by RISE Research Institutes of Sweden AB Partners: Alleima Tube, BridgeNet Solutions - part of PSA BDP, Kalmar, Bromma, Einride, Ericsson, Green Cargo, HERE Technologies, Marine Benchmark, PSA International, Scania, Stora Enso, Wallenius Sol, and Yilport Nordic; the ports of Gävle, Helsingborg, and Kvarken ports Umeå, and the Swedish Ports Association join as advisory partners. Chalmers, Gothenburg University, Stockholm Environmental Institute (SEI), and Umeå University participate as research and innovation partners https://www.ri.se/en/news/launching-networked-virtual-watch-tower-project-for-supply-chain-performance Duration: 2023 - 2025 Costs: 5.9 million SEK
Development of ITS use as a subset of the Action Plan for large cities, a business area-wide platform with metropolitan connections.	The aim is to strengthen and coordinate measures aiming to achieve increased accessibility, reduced congestion, reduced emissions and reduced delays. Ongoing operations within the Swedish Transport Administration's Region Stockholm, examples of current activities: • New traffic control project • Smart Intersection Traffic Signals Test • Testing of GPS in tunnels • Work with Service Levels - impact assessments Research projects on environmental management and highway management are also included as parts of the action plan. Duration: 2018 →

C-ROADS	Collaboration platform for European C-ITS implementations in line with the ITS-directive, including focus on standardization through specifications mainly regarding communication protocols and security models for data transfer. Swedish Transport Administration is participating and has a role in the steering committee.
RWW, RoadWorks Warning	The purpose of this activity within Nordic Way 3 was to demonstrate the possibility to communicate between vehicles, infrastructure and clouds, and to show the interoperability and flexibility of the Interchange network. A specific focus of this action is to evaluate the needs, costs and benefits associated with large scale implementations. This is done by testing and evaluating the services in large scale under naturalistic conditions. RWW is one of several services that was tested within Activity 5, Coordinated pilot on Day1 and Day 1.5 C-ITS services. The Swedish and Norwegian pilots include real time RWW messages produced by the maintenance operators, such as Svevia, Skanska, PEAB, Terranor, Ramudden and Mesta. The pilots include data from several real time data sources · MIP (mobile in data plowing vehicle)(Sweden) · TMA (truck mounted attenuator)(Sweden) · RSU (Road Side Units) (Sweden-Norwegian https://www.nordicway.net/flagship/road-works-warning Duration: 2021-2024
Traffic Signal Priority	The purpose of the Traffic Signal Priority pilot, within Nordic Way 3, is to test the deployment of a Traffic Signal Priority service that fulfils compatibility and interoperability in all parts of the ecosystem: vehicles, backend/cloud and roadside. Furthermore, the purpose is to reach a shared understanding of how the TSP service should be deployed, what architectural design choices are required, which standards and specifications are applicable, and what is not prescribed in these and must be designed within the framework. The NordicWay 3 Traffic Signal Priority pilot tested the existing open standards for traffic signal prioritisation, namely MAPEM and SREM/SSEM, along with the communication infrastructure that includes the Interchange Node. The pilots sites support prioritisation for various types of traffic: emergency vehicles, public transport, and goods transport. On-street testing was taking place in Stockholm and Uppsala. Partners: Swedish Transport Administration and Sweco.

	https://www.nordicway.net/flagship/traffic-signals Duration: 2021-2024
MMTL2	Multimodal Traffic Management part 2, MMTL2 is a continuation project linked to MMTL and POST - Prediction and Scenario Based Traffic Management. The aim is to enable multimodal traffic management by extending the dynamic estimation of OD matrix and route selection. This can provide a larger palette of alternative measures and a better basis for selecting measures for traffic control centres (Trafikverket, 2023). Duration: 2023-2026 Costs: 5 million SEK
Simulation models, method and technology for Nordic C-ITS services	Simulation models, method and technology for Nordic C-ITS services is a doctoral project at Swedish National Road and Transport Research Institute (VTI) that aims to develop a simulator-based method for optimal development of Nordic C-ITS services in so-called "Day 1 and 1.5 services". The project was closely linked to the NordicWay3 project. Duration: 2020-2023 Costs: 9.4 million SEK
GeoSence	GeoSence is a European collaboration on geofencing in traffic management and planning involving partners from Sweden, Norway, Germany and the UK. The aim is to design, test and evaluate geofencing concepts and solutions for specific urban cases and to propose new ways to successfully deploy geofencing technologies (CLOSER, 2021-07-09). https://jpi-urbaneurope.eu/news/geofencing-for-traffic-management-learn-from-new-projects-results-by-geosence/ Duration: 2021-2024 Costs: 16 million SEK
Mobile rural areas	The purpose of the project is to make public transport more effective by coordinating socially paid travel with other modes of transport. Objective: Demand response traffic (DRT) in the pilot municipalities includes all available modes of transport for best service to rural residents and reduced environmental impact. Project coorinated by Luleå tekniska universitet and financed by Vinnova. https://www.vinnova.se/en/p/mobile-rural-areas/ Duration: 2021-2025

	Costs: 3 million SEK
Digital Transport Southern Stockholm (DTSS)	Develop a consensus between key actors in the southern part of the Stockholm region on how smart, multimodal forms of operation and governance can be established for freight transport. The purpose of DTSS, with Norvik harbour as an important prerequisite, has been to understand how digitization, automation and electrification can contribute to smart multimodal logistics systems. Final report in October 2023. Partners: Region Stockholm, Nynäshamn, Huddinge and Haninge municipalities, Swedish Transport Administration, KTH, Ellevio, Einride, Ericsson, Scania, Telia. https://www.lindholmen.se/sv/digital-transport-southern-stockholm Duration: 2022 - October 2023 Costs: 2.8 million SEK
5G for Connected Autonomous Vehicles in Complex Urban Environments	The objective of this project is to harness the state-of-the-art cellular communication technologies to solve the following two problems: 1. establishing requirements on the communication to enable a safe interaction of connected autonomous vehicles (AVs) with the surrounding environment and 2. learning, and then predicting, the behaviour of human road users in traffic situations. Project coordinated by Chalmers Tekniska Högskola AB and financed by Vinnova. https://www.vinnova.se/en/p/5g-for-connected-autonomous-vehicles-in-complex-urban-environments/ Duration: 2019-2026 Costs: 7.9 million SEK
From Connected to Sustainable Mobility (FREEDOM)	Analyse data from connected cars to understand the efficiency of current transport systems and the factors affecting CO2 emissions. Project coodinated by Högskolan i Halmstad. https://www.vinnova.se/p/from-connected-to-sustainable-mobility-freedom/ Duration: 2021-2024 Costs: 10.5 million SEK
PROactive SENSorics for autonomous vehicles (PROSENSE)	Increase knowledge about traffic congestion and possible scenarios that could lead to congestion caused by autonomous vehicles. Project coodinated by Scania CV AB https://www.vinnova.se/en/p/prosense-proactive-sensing-for-autonomous-driving/

	Duration: 2021-2025 Costs: 32.5 million SEK
Implementation of Digital Winter Road Layer Information for Efficient and Sustainable Municipal Winter Road Management.	Connected vehicles are used to collect data on winter road surfaces to facilitate road maintenance. Examples of data to be collected include road friction data and temperature. Partners: ViaPM AB, NIRA Dynamics AB, Luleå University of Technology and Gothenburg Traffic Administration Office. https://www.niradynamics.com/latest/modern-winter-maintenance-efficient-and-sustainable Duration: 2021-2024 Costs: 1.9 million SEK
SMART 3	Further develop current traffic models to investigate whether the current infrastructure is ready for autonomous vehicles. The project is a continuation of SMART2 and consists of two PhD projects. https://www.kth.se/polopoly_fs/1.1189748.1662619894!/7-SMART3-Ivan%20Postigo.pdf Duration: 2022-2024 Costs: 6.2 million SEK
FOKA	Explore how autonomous vehicles can be integrated into public transport from a technical, legal, psychological and social science perspective. https://www.itrl.kth.se/research/ongoingprojects/foka-1.1109873 Partners: Nobina Technology, Telia, SL/Region Stockholm, Järfälla kommun, Observit. Duration: April 2021- October 2023 Costs: 5.8 million SEK
Testsite Amsberg	Amsberg in Borlänge is a testing site for the Swedish Transport Administration which provides space for testing other organizations stationary detection systems within ITS and carry out digital measurements of Bridge weight in motion data (BWIM) and speed data for heavy vehicles. https://bransch.trafikverket.se/for-dig-i-branschen/forskning-och-innovation/aktuell-forskning/transport-pa-vag/testsite-e18--en-vagforskningsstation/ Duration: 2021 → Costs: approx. 3 million SEK per year

Dashboards for Decision Support in Highway Congestion (LIU)	In this project, the aim to investigate real-time visualization techniques to provide more comprehensive solutions for managing highway congestion and optimizing traffic flow. By employing state-of-the-art data analytics and visualization tools the project result will enable transportation authorities to make informed decisions and implement proactive measures for alleviating congestion and enhancing the overall performance of the highway network. The project is carried out with three partners: LIU, KTH and Xtelligent. https://futuremobility.lindholmen.se/en/project/dashboards-decision-support-highway-congestion-management Duration: 2023-2025 Costs: 1.1 million SEK
Travalytics	Travalytics offers an automated solution to gather and analyse commuting data, helping companies meet Corporate Sustainability Reporting Directive (CSRD) requirements and reduce environmental impact through sustainable commuting options. Method and outcomes: Using a mobile app and advanced algorithms, Travalytics tracks commutes and generates reports on CO2e emissions, travel modes, and distances. Initial testing in Lund begins fall 2024, with a European launch set for 2025. The project aims to improve reporting regarding sustainable commuting habits. https://www.drivesweden.net/projekt/travalytics-en-innovativ-losning-data-hallbara-pendlingsresor Partners: Trivector Traffic, Backtick Technologies, Tetra Pak, IDA Duration: 2024-2025 Costs: 1.0 million SEK
European Rapid Bus Transit 2030	The eBRT2030 project aims to develop a new generation of fully electric Bus Rapid Transit (BRT) systems, enhanced with automation and connectivity features to support sustainable urban transport. The project focuses on reducing costs, emissions, and traffic congestion by implementing innovative solutions at the vehicle, infrastructure, and IoT connectivity levels. https://www.k2centrum.se/european-bus-rapid-transit-2030-electrified-automated-connected Partners: Lund University, K2, Horizon Europe Duration: 2023-2026 Costs: 1.3 million SEK

Major Projects and Program	Description
Drive Sweden	Drive Sweden is a Strategic Innovation Program launched by the Swedish government that gathers the best in the area – from all sectors of society. The challenges tackled along the way could pertain to road safety, adaptation of infrastructure and legislation that needs updating. Partners in the program, e.g., Ericsson, Swedish Transport administration, Scania, Volvo Cars Company, Volvo Trucks. In total, Drive Sweden has more than 40 partners. Drive Sweden establishes an open environment for developing cloud services, and that data access and data exchange can be done efficiently, as well as creating data exchange capabilities through open APIs and a library of interfaces and the ability to store data in the cloud. https://www.drivesweden.net/ Duration: 2015 - 2025 Costs: 20 million SEK per year
FEDeRATED	FEDeRATED is an EU CEF project for digital co-operation in logistics which consists of 15 partners located in 6 EU Member States (Luxemburg, Italy, Finland, Netherlands, Spain, Sweden). FEDeRATED is an open data-sharing infrastructure for smooth, safe and sustainable freight transport and logistics in Europe and its trading partner countries. Final testing reports for pilots/living labs was carried out 2024. Some living labs continue under the program eFTI4all. Duration: 2019-2024 Costs: 32.5 million SEK
eFTI4ALL	Regulation (EU) 2020/1056, establishes a legal framework for the electronic exchange of freight transport information (eFTI) across the European Union. The regulation aims to digitalise freight transport operations, making it mandatory for public authorities to accept electronic transport documents provided by businesses. Living labs in Sweden introduced within FEDeRATED will be developed to the next level linked to the introduction of the eFTI regulation. The eFTI4ALL project together with EFTI4EU project a high focus in the DTLF work. https://www.digitaltrade4.eu/electronic-freight-transport-information-efti/ Duration: 2024-2029 Costs: 20 million SEK

FFI (Strategic Vehicle Research and Innovation)	The Swedish Government and industry are investing in a long-term partnership within FFI (Fordonsstrategisk, Forskning och Innovation/ Strategic Vehicle Research and Innovation.) FFI funds R&D that focuses on energy, environment, safety and automation. The effort is ongoing and includes 90 million Euro per year, half of it comes from public funds through VINNOVA, Swedish Transport Administration and the Swedish Energy Agency. An equivalent amount is invested by the four industrial partners: Volvo Trucks, FKG (Scandinavian Automotive Suppliers), Scania and Volvo Cars Company. Duration: 2016 → Costs: Approx. 900 million SEK per year
RFID in Rail	RFID in Rail (Identification and Positioning of Railway Vehicles) aims to improve the supply chain through the use of 400 readers to identify train wagons at terminals. In Sweden the research platform called Deplide receives the messages from the Spanish intermodal system SIMPLE. From Deplide there are multi connections possible to every stakeholder. The use case is to share data from freight wagon movements in real-time from Swedish paper mills to European terminals. The concept is both connecting to EDIC work but mainly integrated in Sustainable hubs concept from previous FEDeRATED and integrated in Europes Rail seamless operations. Solutions connecting to Nordic developments is also taking place via the programme of Nordiska ministerrådet as well as Vinnova projects with Port of Gothenburg as project leaders. Duration: 2019-2023 Costs: 4 million SEK
Scandinavia - Mediterranean corridor	The main focus is to increase transparency and traceability in logistics supply chains, both first and last mile and long-distance transportation through Finland, Sweden and Denmark. This will be achieved through invisible data integration throughout the supply chain that connects the different actors. Duration: 2021-2023
ASTER	ASTER (Alliance for sustainable e-commerce) brings together organizations from society, business and academia with funding from Vinnova and the Swedish Energy Agency - to show that e-commerce can be efficient, competitive and sustainable. ASTER is run jointly by Lund University and Lindholmen Science Park. The program finances projects that study sustainable freight transport and logistics solutions as important parts of e-commerce.

	https://aster.lindholmen.se/sv/om-aster Duration: 2021 - 2024 Costs: 10.4 million SEK
B.E.A.st. – ELSA	The focus is on jointly establishing a way forward for applicable semantics and data exchange mechanism of climate data for construction and maintenance of road and rail infrastructure. https://bransch.trafikverket.se/om-oss/aktuellt-for-dig-i-branschen3/aktuellt-om-forskning-och-innovation2/2024-02/delad-data-for-digitala-och-effektiva-transportfloden-i-europa/ Continuous work in direction of implementation at Trafikverket. Connection to eFTI parts could be possible via Peppol solutions. Duration: 2022-2024 Costs: 3.5 million SEK
PERFORMING-RAIL	PERFORMINGRAIL - aims to reduce risks to the market through optimal traffic management and rail signalling with train positioning methods but also by updating regulations (Shift2Rail, 2021). Duration: 2020-2023 Costs: 13 million SEK
Campus2030	Create a digital twin of KTH's road infrastructure to conduct experiments and research on smart transportation. https://www.kth.se/mmk/mechatronics/current-projects/campus-2030-enabling-systemic-solutions-for-smart-roads-1.1043077 https://www.campus2030.se/ Duration: 2020-2023, ongoing Costs: 3.8 million SEK
TRANS4M-R	IVG (intelligent video gate) checkpoints for railway are being developed as part of EU Rail program. The system Deplide is used for data sharing, but the idea is that IVG should be used with a citrix solution. Duration: 2023 →

2.2.2. Progress since 2023

Description of progress in the area since 2023:

Several projects have started during the period as described in table 2.2.1.

A number of the major projects and programs completed in 2023 or 2024 their final project activities and final reporting of results. Examples of progress listed below:

- In RFID in Rail there are approximately 400 RFID locations installed in Sweden where train movements are recorded in real time during passage. Corresponding systems also exist in several countries in Europe, of which Denmark, France and Germany are directly involved in this flow. Data from the Spanish RFID readers is transferred to the state-run Spanish IT platform SIMPLE managed by ADIF, Puerto de Estados and Renfe.

  The Swedish platform Deplide, developed and operated by RISE in Sweden, which receives read data from SIMPLE. Data sharing follows the federated principles developed within Federated. The logistics information can thus be shared between the various stakeholders in the transport chain using ”The FEDeRATED Way”. During March 2023 to September 2023 tests was conducted with over 4 million RFID readings in Sweden at 400 reading points. The developments have continued with active partners in the Nordics but also in Port of Gothenburg. Via Europes Rail project there will also be new investments in the border to Denmark.

- RRTCDM project: Collaborative Decision Making (CDM) is a method to increase data exchange between actors in the transport chain, and thus achieve increased efficiency and reduced handling and transport costs. In the RRTCDM project, the concept of import and export flows has been tested and evaluated at the combination terminal Solåsen in Jönköping as a test case. Until December 2023 tests of train announcement RCMF, train announcement TCMF and daily route plans was conducted with a total of more than 200 million text messages.

  These developments connected to Railway is now placed in Europes Rail-Seamless operations, but also discussed in the corridors with RNE. A demonstrator is also planned with R-CDM as a part of Seamless corridor activity. The R-CDM is also combined with Airport-CDM in the new SESAR and EU Rail project TravelWise.

- In the European collaboration program GeoSence the aim was to design, test and evaluate geofencing concepts and solutions for specific urban cases and to propose new ways to successfully deploy geofencing technologies. In 2024 the project presented a Strategic guideline for implementation of urban geofencing solutions. [7]

[7]https://closer.lindholmen.se/sites/default/files/202408/Strategic%20guidelines%20for%20implementation%20of%20urban%20geofencing%20solution_0.pdf

2.3. Priority area III. Road safety and security ITS services

2.3.1. Description of the main national activities and projects

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

Project/activities	Description
EVA, Emergency Vehicle Approaching	The purpose of the EVA pilot is to provide drivers with quick and accurate information and warnings about some of the possible hazardous events on the roads. This, in turn, can help prevent incidents and accidents, as well as reduce congestion. The EVA service is planned to cover Swedish highways and national roads and the pilot is aiming for deployment after the Nordic Way 3 project. Furthermore, driving simulators will be used to gain a greater understanding of driver behaviour when receiving EVA or Accident Zone Warnings. The pilot focuses on scenarios where the positive effects on traffic safety and emergency response times of reaching out with those warning messages are likely to be high. Partners: Swedish National Road and Transport Research Institute (VTI), Volvo Car Corporation, Scania CV AB, SOS Alarm, Carmenta Automotive and Evam. https://www.nordicway.net/flagship/emergency-vehicles Duration: 2021-2024
HAST - Speed-controlled traffic zone in urban environments (CLOSER)	A large-scale system demonstration in a city centre where various modes of transportation are speed-controlled through digital solutions, including geofencing – a virtual fence that can trigger for example speed control within a specific area. The demonstration will take place in the first half of 2024 in central Enköping and involve over 100 vehicles. The demonstration area is approximately two kilometres in diameter with many unprotected road users, such as pedestrians and cyclists. By demonstrating the effectiveness of the technology, the parties aim to inspire cities, road authorities, transport buyers, and carriers, both in Sweden and internationally, to view digital solutions, such as geofencing, as a tool to enhance traffic safety in urban environments. https://closer.lindholmen.se/en/project/hast-speed-controlled-traffic-zone-urban-environments The project is led by CLOSER and other partners include Enköping municipality, VTI (Swedish National Road and Transport Research Institute), V-tron, Keolis, Martin & Servera, Småfrakt, Dagab, Enköpings Åkeri, and Allmiljö

	Duration: August 2023 – September 2024 Costs: 5 million SEK
ZeZo Score – the tool of the future for safer urban mobility	VIA-Taxi represents a ground-breaking investment in traffic safety and digital innovation that redefines the landscape of safe passenger transport and offers a vision for a safer and more sustainable future linked to urban mobility. By combining the Nordics' leading taxi network, Cabonline, with the latest cloud-based technology in traffic safety and data analysis, ZeZo-score, VIA-Taxi strives to create a future where traffic accidents are rare and where drivers and passengers can feel safe. https://www.drivesweden.net/projekt/zezo-score-framtidens-verktyg-sakrare-urban-mobilitet Partners: Cabonline, Nollzon Green Tech, KTH, EIT, Chalmers and SAFER. Duration: 2024-2025
Traffic Safety cameras (ATK)	Automatic traffic safety control (ATK) is an automatic speed monitoring system with cameras where speed is measured using radar technology.Traffic safety cameras are used on road stretches and places where the risk of accidents is high and where, before the cameras were set up, speed was high. During the period 2021 to 2023 the Swedish Transport Administration has established 389 places with Automatic Traffic Safety Control. The ATK system is managed jointly by the Swedish Transport Administration and the Swedish Police. https://trafikverket.diva-portal.org/smash/get/diva2:1901203/FULLTEXT01.pdf Duration: 2006 →
HITS2024	HITS2024 (Sustainable & Integrated Urban Transport Systems) is a cross-industry collaboration between property owners, municipalities, logistics companies and academia. The goal is to develop sustainable transport solutions for an attractive and safe city. The project is led by Scania and the project coordinator is CLOSER. https://closer.lindholmen.se/en/project/hits-2024 Duration: 2020-2024 Costs: 35 million SEK

Teleoperated & Autonomous Machines in the mining process	More effective use of machinery in the mining environment to remove people from the mining environment and thereby increase safety. https://www.vinnova.se/en/p/tammp-wp3---tele-operated--autonomous-machines-in-the-mining-process/ The projevt was coordinated by Volvo Construction Equipment AB - Volvo CE, AE Planning, Funding and PM. Duration: 2020- August 2023 Costs: 22.6 million SEK
MICA2 - Modelling Interaction between Cyclists and Vehicles	A continuation of MICA1 and aims to increase the safety of overtaking cyclists in traffic, now at higher speeds. The results will lead to new safety systems in cars. https://www.vinnova.se/en/p/mica2---modelling-interaction-between-cyclists-and-automobiles-2/ The project was coordinated by Chalmers Tekniska Högskola AB - Applied Mechanic Duration: 2019- July 2023 Costs: 23.3 million SEK
MicroVision	This project focus on development, testing and demonstration of a real-time support system for drivers of electric vehicles. The goal is to leverage new advances in algorithm development to improve safety and sustainability in the context of micro mobility. Within the project, we want to develop a camera-based security system from low-cost components that provides real-time support to e-scooter drivers and cyclists. https://www.drivesweden.net/projekt/microvision-utveckling-testning-och-demonstration-av-ett-stodsystem-i-realtid-forare-av Partners: Autoliv, Chalmers tekniska universitet and SAFER. Duration: 2023-2025
I2Connect	Development of the next generation of advanced driver assistance systems (ADAS) for trucks. By a combination of data from external cloud database and internal driver monitoring systems, the project will evaluate the new ADAS system with focus on safety, efficiency and user experience. This study is conducted at Högskolan at Skövde. The goal with the project is to increase the acceptance of ADAS among drivers and to increase the use of the system for the entire journey. Partners: Skövde University, Scania, Smart Eye and Viscando. https://www.vinnova.se/en/p/intelligent-interactive-and-connected-i2connect---next-generation-of-realtime-driver-safety-support-systems/ Duration: 2023 - 2026

	Costs: 7.5 million SEK
Traffic and Safety - connected vehicles for innovative traffic safety analysis	The project aims to study how data from connected vehicles can be used to identify high-risk traffic areas. It will analyse vehicle speeds and map sections with speeding and hard braking incidents. The goal is to create a dashboard for road managers to highlight risk indicators and propose preventive measures to reduce traffic accidents. The project hopes to pave the way for new data-driven methods to assess road safety, contributing to fewer accidents and aligning with Vision Zero. It will also provide municipalities with a universal method for traffic safety evaluation, supported by data from connected vehicles and field studies. https://www.drivesweden.net/en/project/connected-vehicles-innovative-traffic-safety Partners: Ramboll Sweden AB, Nira Dynamics AB, Viscando Systems AB, Stockholms stad, Uppsala kommun, Vallentuna kommun Duration: 2024-2025 Costs: 1.0 million SEK
Detect influence of drugs through image analysis	Volvo Group and Sightic Analytics are working together to develop a solution for detecting intoxication in heavy vehicles, addressing both technical and commercial challenges. The goal is to create a sustainable solution that adds value for fleet operators, enhances driver safety, and respects privacy. The project includes four main work packages: developing concept software, data collection in a simulator, defining requirements, and establishing a sustainable business model. https://www.vinnova.se/en/p/detect-influence-of-drugs-through-image-analysis---step-2/ Duration: 2023-2024 Costs: 1.8 million SEK
DAIMOND	Data and AI for decision Making suppOrt in traffic iNfrastructure Development (DAIMOND). The project will deliver an AI-based decision support prototype for the design of zebra crossing or zebra-less crossing in school areas, with a strong emphasis on safety. Through development and implementation of the prototype, the municipality will gain valuable insights into potential of AI methods. The project´s results will not only benefit Jönköping, but also serve as a valuable model for other municipalities that want to improve their planning and development of road infrastructure through data-driven and AI methods. https://www.vinnova.se/en/p/data-and-ai-for-decision-making-support-in-traffic-infrastructure-development-daimond/ Partners: Jönköping municipality, researchers in AI from Jönköpings Universitet and Viscando.

	Duration: 2023-2025 Costs: 0.6 million SEK
Safer Crossways using I2V	This project focuses on improving road safety by implementing Infrastructure-to-Vehicle (I2V) communication systems. These systems allow connected vehicles and roadside units (RSUs) to exchange critical information, enhancing mobility and reducing accidents. The goal is to evaluate the feasibility of creating an open, standardized, and communication-agnostic RSU architecture. The study aims to simplify implementation and lower costs, resulting in faster deployment and reduced traffic fatalities. It will also explore legal and security concerns and deliver a feasibility report and potential proof-of-concept for the open RSU architecture. The project is coordinated by MittLogik Solutions AB. https://www.vinnova.se/en/p/safer-crossways-using-i2v/ Duration: 2024 - 2025 Costs: 0.5 million SEK
NOAI	The project “No AI About Us Without Us: Enhancing Safety for Vulnerable Road Users (VRUs) with Reduced Mobility" is abbreviated as NOAI . The goal of the project is to develop an automated AI platform that can learn from the user’s behaviour and preferences. The platform will also be able to provide feedback and suggestions on how road users can move safely in traffic. Partners: Chalmers University of Technology and the University of Gothenburg, Chalmers Industrial Technology, the traffic research center SAFER. https://www.gu.se/en/news/ai-to-make-traffic-safer-for-people-with-reduced-mobility Duration: 2024 - 2026 Costs: 2.2 million SEK
Cyberinfra	The project aims to develop, integrate, verify, validate, and refine a prototype for connected traffic infrastructure, assessing its impact when used with other connected systems. It focuses on the benefits of interoperable, digital traffic solutions linked to open data platforms via 5G, utilizing digital and TMA signs to reduce accident risks near roadworks. Expected outcomes include a significant reduction in accidents involving TMA vehicles and chain collisions before roadworks, along with insights into digital infrastructure requirements for future transportation systems. The project has seven work packages and is coodinated by AstaZero AB.

	https://www.vinnova.se/p/cyberinfra-cybersaker-trafikinfrastruktur-for-det-digitaliserade-transportsystemet/ Duration: 2024 - 2026 Costs: 3.4 million SEK
AI-Based Digital System for Preventing Animal Collisions in Rail Transport	The project tackles a major railway industry challenge: wildlife collisions, which cause significant train damage, delays, driver trauma, and harm to animals. Existing methods to reduce these incidents have proven ineffective, so the project aims to develop a new digital solution to address these issues and enhance digital infrastructure. Expected outcomes include improved safety, efficiency, and accessibility in the rail sector by using advanced technology for automatic wildlife deterrence to reduce collisions. Led by Alstom and FLOX, the project combines Alstom's transport expertise with FLOX's AI-driven wildlife management, organized into work packages for implementation, integration, business modelling, system development, and operational evaluation. https://www.vinnova.se/p/ai-baserat-digitalt-system-for-forebyggande-av-kollisioner-med-djur-i-tagtransportsystem/ Duration: 2024 - 2025 Costs: 3.3 million SEK
Advanced Radar Sensor Front-end Modules and Solutions for Increased Road Safety	This project aims to enhance traffic safety by developing advanced polarimetric radar sensors for autonomous vehicles, improving object detection and tracking, especially in all-weather conditions. These sensors will boost early collision avoidance, accurately detect large objects and vulnerable road users, and contribute to safer, sustainable transport. Partners: Statens Väg- & Transportforskningsinstitut - Statens väg- & transportforskningsinstitut VTI och Chalmers Tekniska Högskola AB. https://www.vinnova.se/p/advanced-radar-sensor-front-end-modules-and-solutions-for-increased-road-safety/ Duration: 2024 - 2027 Costs: 14.5 million SEK
Major Projects and Program	**Description**
Nordic Way 3	Through the Nordic Way 2 and 3 projects, a collaboration between public and private partners in Finland, Norway, Sweden and Denmark, an information exchange solution for different enterprise-specific clouds has been developed. The projects enable vehicles, infrastructure and network operators to communicate safety hazards and other information. https://www.nordicway.net/ Duration: 2020-2023

	Costs: Total budget approx. 75 million SEK 14 implementing bodies
Safety assurance framework for connected automated mobility systems (SUNRISE)	SUNRISE is about safety proof of cooperative, connected and automated mobility (CCAM) systems. The aim is to develop and provide a harmonized and scalable CCAM Safety Assurance Framework. The project will define, implement and demonstrate the building blocks of this safety argumentation framework: harmonized and scalable methods for safety assessment, procedures and metrics tailored to use cases, a federated framework for a European scenario database and its necessary data interfaces, a commonly agreed simulation framework including tools and interfaces. Partners: AVL, BASt, Chalmers, Continental, STELLANTIS / CRF, CVC, ERTICO, ICCS, ika, Infineon, VEDECOM, Renault Group, RISE, Siemens Software, TNO, Toyota Motor Europe, University of Trento, Vicomtech, Virtual Vehicle, WMG. https://www.ri.se/en/what-we-do/projects/safety-assurance-framework-for-connected-automated-mobility-systems Duration: 2022-2025 Costs: 150 million SEK
5G Edge Enabled Smart Communities for Green Transformation in the North Project (ED5GE)	The project will enable the implementation of a range of smart community applications at four different sites, aiming to enhance public safety and security and improve emergency response times in a port area; improve waste and recycling management in a city area; provide city traffic services for mobility and traffic control; and improve sustainable agricultural practices through smart and precision farming. The network will allow understanding and improving traffic flow and intensity in real time by enabling the use of traffic camera sensors and image recognition of video streams through machine learning and edge processing; transmitting live video streams to emergency responders; and collecting data for the creation of digital twins with real-time map information as well as flows and data from objects. Partners: RISE Research institute of Swedem, Luelå municipality and Bodens Utvecklinhs AB. https://digital-strategy.ec.europa.eu/en/news/5g-edge-enabled-smart-communities-green-transformation-north-project-ed5ge Duration: 2024 - 2026 Costs: 47 million SEK

2.3.2. Progress since 2023

Description of progress in the area since 2023:

During the period 2021 to 2023 the Swedish Transport Administration has established 389 places with Automatic Traffic Safety Control which together cover around 970 km of the road network, and in total 2484 cameras cover around 6 200 km of the road network. During the period 2021--2023 389 cameras have been dismantled in connection with improved road safety and been replaced by cameras with advanced technology.

A number of projects within the priority area, Road safety and security ITS services, have started during the period as described in table 2.3.1.

The Swedish authority Transport Analysis reviews bases for decisions, assesses measures and is responsible for statistics. Transport Analysis has analysed how EU Member States have implemented the requirements of EU 886/2013 on Safety Related Traffic Information (SRTI). The agency has reviewed national progress reports, NAPs and SRTI services, including the searchability and availability of SRTI data, their format and content. The focus of the implementation work is still on development, making SRTI data accessible. More than half of the NAPs (14) are not searchable on SRTI data, that also applies for Sweden. Only two countries report information services based on SRTI data in accordance with EU 886/2013. There is a general lack of information on criteria and procedures for SRTI as a traffic alert system.

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

Information on any changes regarding the national eCall PSAPs infrastructure and the authorities that are competent for assessing the conformity of the operations of the eCall PSAPs:

At the Swedish eCall PSAP, SOS Alarm Sverige AB, has packet switched technology since November 2022, i.e. IP telephony for 112. It gives SOS Alarm the opportunity to implement, among other things, NG eCall. Development of it is ongoing at SOS Alarm and they expect to have everything in place by January 1, 2026 at the latest.

Additional information:

No additional information.

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)

Progress made in implementing the information service, including the criteria used to define its level of quality and the means used to monitor its quality:

Identification of the road network and where the service will be provided on the network has been decided by the Swedish Transport Administration. It will cover the whole TERN road network in Sweden.

Organizations interested in the exchange and reuse of data can find information about available services at the National Access Point (trafficdata.se). There are links to organizations that deliver data and the transport network their delivery covers. Organizations - Trafficdata.se

Metadata can be registered and data providers are asked to record metadata when publishing data sets. The responsibility for compliance with the specified quality indicator lies on the data provider.

Results of the assessment of compliance with the requirements set out in Articles 3 to 8 of Delegated Regulation (EU) No 886/2013:

During 2023 the Swedish national body carried out a compliance assessment regarding this regulation under the framework of NAPCORE´s Pilot Trial. In the assessment no discrepencies where found. Since 2023 no compliance assessment has been carried out solely for holders of data for the Swedish road network. The Swedish national body has however continued the participation in activities on EU-wide compliance assessment in the NAPCORE project.

Where relevant, a description of changes to the national access point:

On 8 May 2017, the Swedish Transport administration launched the Swedish National Access Point (trafficdata.se) for priority actions B (real-time traffic information), priority action C (safety related traffic information) and priority action E (truck parking information). The National Access Point was launched during a combined information and "proof of concept" meeting with future users of www.trafficdata.se, including private service providers such as TomTom, HERE and Media mobile. One of the objectives of the meeting was to show the advantages of being part of the community and to make the information service providers familiar with the updating procedures for their information in the portal. In addition, the harmonized "self-declaration" was presented by The Swedish Transport Agency.

Additional information (e.g. sources of data used for the provision of safety-related traffic information):

For priority action C, a description of dataset from Swedish Transport administration and Mediamobile is available at the Swedish National Access Point, www.trafficdata.se. Today you can find the following safety-related traffic information data at the NAP. Exceptional weather conditions, unmanaged blockage of a road, Wrong way driver, Temporary slippery road, obstacle on the road, unprotected accident area, Short-term Road works, reduced visibility at the access point.

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)

Number of different parking places and parking spaces on their territory:

There are 331 state owned rest areas along major roads in Sweden, depending on how the road network and the ownership is defined. 257 can accommodate HVD parking (979 HVD truck parking capacity). However, 161 of these rest areas are designated as particularly suitable for heavy truck parking (639 HVD truck parking capacity). The number of commercial safe and secure parking places is around 99 for the same road network. The commercial parking capacity is 1562 HVD trucks. About 60% of the commercial parking capacity offers enhanced security and additional amenities like restaurants and restrooms. In addition, there are 11640 HVD parking spots, that are not part of a public or commercial rest area, along this network where

parking is available adjacent to the road. The data are also published on the European Open Data portal for Truck Parking hosted by DG MOVE.

The 2024 inventory of all state-owned rest areas, commercial safe and secure parking facilities and freestanding parking spots along the major roads is concluded. However, the analyses of the results are not finalized at the time of this reporting. Upon conclusion, the new up-to-date data attributes regarding safety and service levels, capacity and more will be made available via the national and European data access point.

Percentage of parking places registered in the information service:

The analyses of the results for 2024 are not finalized at the time of this reporting. Upon conclusion, the new up-to-date data attributes regarding safety and service levels, capacity and more will be made available via the national and European data access point.

Percentage of parking places providing dynamic information on the availability of parking spaces and the priority zones:

There aren't any public or commercial facilities that today can provide dynamic information of parking spaces. Commercial actors offer services with forecasts for potentially vacant parking spaces based on static data.

The Swedish National Access Point (NAP) www.trafficdata.se include data for priority action e (truck parking information) and the Swedish state-owned rest areas for the delegated act e is published on the European Access Point for Truck Parking hosted by DG MOVE.)

Additional information: (e.g. has a national access point been set up to provide truck parking data? Does this include dynamic data? What is the source of data (public / private)? Are the data published on the European Access Point for Truck Parking hosted by DG MOVE? If not, is there any intention to do so in future?) See above.

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

2.4.1. Description of the main national activities and projects

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status: in particular, provide information on the C-ITS deployment initiatives and their technical specifications.

Project/activities	**Description**
Test lab Awitar	Awitar, stands for Automotive Wireless Test and Research Facility. The facility has been developed in close collaboration with the Swedish automotive industry, including Volvo Cars, which was one of the first customers to use the new facility.

	Through Awitar's 6 meter x 6 meter gate opening, cars as well as trucks, electric bicycles and buses can roll in. The floor is dimensioned to withstand the weight of a tank. Inside the test chamber, the vehicle's electronics are tested so that they are neither disturbed by nor disturbed by the surroundings. The more complex vehicles that roll on our roads, the more important it is with interference tests. https://www.ri.se/sv/berattelser/awitar-testar-framtidens-fordon Duration: 2018 →
VICTA Lab	Before the autonomous vehicles can reach our roads, simulations, testing of components, virtual tests, disturbance tests, tests in closed and real environment are needed. RISE Research institue of Sweden, has the expertise and testbeds and can support the entire development chain for autonomous vehicles. In VICTA Lab, RISE provides a generic platform that can run models from vehicle manufacturers and connect to digital models of test environments or the outside world. https://www.ri.se/sv/berattelser/sa-testas-automatiserade-fordon Duration: 2021→
Future 5G Ride	Enabling scaled-up, safe and efficient driving with driverless vehicles. The project consists of two steps where the first step aims to increase monitoring and communication between vehicles. The second stage aims to enable autonomous vehicles to cope with more traffic situations than before. The project is coodinated by Kista Science City AB. https://www.vinnova.se/p/future-5g-ride/ Duration: 2021-2025 Costs: 15 million SEK
AllDrive	Develop an autonomous vehicle system that can drive safely in critical weather conditions, such as on wet or icy roads. https://www.klimator.se/research-project-alldrive Partners: Klimator, Scania, KTH Royal Institute of Technology, and Luleå University of Technology and financed by Vinnova. Duration: 2022-2026 Costs: 46.8 million SEK
MIMO-PAD	Improve the ability of self-driving cars to position themselves, allowing the vehicle to better cope with demanding situations such as dense cities and bad weather. https://www.vinnova.se/p/mimo-pad/ Partners: Volvo Personvagnar AB, Scania, FFI, FKG, Energimyndighetem and Swedish Transport Administration.

	Duration: 2019-2024 Costs: 11.4 million SEK
iDecide	Develop movement planning algorithms for how heavy autonomous vehicles should interact with other road users in an urban environment. The project is coodinated by Linköpings universitet. https://www.vinnova.se/en/p/idecide/ Duration: 2021-2025 Costs: 11.5 million SEK
H2020 - SHOWSHared automation Operating models for Worldwide adoption	Deploy autonomous vehicles that interact with urban traffic and public transport in various locations across Europe. In Sweden, demonstration sites are located in Gothenburg and Linköping. https://cordis.europa.eu/project/id/875530/reporting Duration: 2020-2024 Costs: 22.6 million SEK
Cooperative Autonomous Transport (SAT)	Investigate what happens when several different self-driving transport modes coexist in an urban environment in order to produce a knowledge base that facilitates the long-term planning of the transport system. https://www.drivesweden.net/en/project/synergetic-autonomous-transport Project partners: Akademiska Hus, Chalmers, Chalmersfastigheter, Ericsson, Framtiden Byggutveckling, Urban Transport Administration City of Gothenburg, University of Gothenurg, Hugo Delivery, Johanneberg Science Park, Keolis, Landvetter Södra Utveckling AB, MölnDala Fastighets AB, PostNord, Riksbyggen, Skanska, Tele2, Västtrafik, Wallenstam Duration: 2022-2023 Costs: 4 million SEK
PreMAT	Predictive Monitoring for Autonomous Trucks (PreMAT) seeks to lower the thresholds for introduction of autonomous driving systems onto the market by providing an extra layer of safety necessary to perform early testing in relevant environments. The project aims to answer the question how to guarantee that an automated vehicle never exits a predefined physical space, and thereby guarantee the safety outside the vehicle. https://www.vinnova.se/en/p/premat---predictive-monitoring-for-autonomous-trucks/ The project is coodinated by AstaZero AB. Duration: 2022 - 2025

	Costs: 10.3 million SEK
Entice	Develop new real-time analytics capabilities for the assessment of current and residual risk for self-driving vehicles, based on data from various sources including vehicles and roadside sensors, as well as develop a research test bed, in collaboration with the developments taking place within the TECoSA centre. https://www.researchgate.net/publication/381347759_Real_Time_Analysis_of_Self-Driving_Vehicles_using_Computer_Vision Duration: 2023-2025 Costs: 9.8 million SEK
Astazero (Northstar)	At AstaZero outside Borås is the world's first full-scale test environment for automated transport systems with the latest 5G technology where it is possible for companies to test transport systems in their entirety under real conditions. https://astazero.ri.se/ Duration: 2023 →
Telia (Northstar)	Within the framework of the NorthStar innovation program, Telia is developing 150 kilometres of 5G transport corridors along selected routes between important industrial and technology clusters around Sweden as part of the EU CEF2 NETC project. In Stockholm, corridors are being built on the E4 between Södertälje and Nyköping and Solna and Rosersberg, as well as on the E18 between Danderyd and Kapellskär. In Gothenburg, corridors are being built along National Highway 40 between Råda and Hindås and Hindås and Viared, in close proximity to AstaZero, a full-scale test environment for automated transport systems. https://www.drivesweden.net/sites/default/files/2024-06/Telia%20-%20NorthStar.pdf Duration: 2023 →
Autofreight	The Autofreight project will store, manage, and analyse data from test vehicles to improve detection of critical events in time series data. It will evaluate “Foundation Models” for large datasets like tire data, particle emissions, and safety video of double A-trailer trucks. Expected outcomes include easier data sharing, validation of Foundation Models for time series, and insights for creating next-gen "Digital Twins." https://www.vinnova.se/en/p/foundation-models-for-time-series-automotive-large-scale-data/ Partners: Volvo, Goodyear, University of Gothenburg, Chalmers and VTI. Duration: 2024-2026

	Costs: 3.7 million SEK
Winter Hugo	The "Winter-Hugo" system demonstrator aims to develop and evaluate two transport services using a small, autonomous transport robot, co-developed with users to focus on transporting lightweight goods in challenging winter conditions. This initiative seeks to accelerate the transition to a more fossil-free and inclusive transport system for rural areas as part of the Accelerate subprogram for FFI. Expected outcomes include designing autonomous transport solutions to strengthen Swedish preparedness and support within agriculture and forestry, specifically creating a service for transporting supplies from storage to operational areas during mobilization. The project is led by the Swedish National Road and Transport Research Institute (VTI). https://www.vinnova.se/p/vinter-hugo/ Duration: 2024-2027 Costs: 15.8 million SEK
FederatedFleet Learning	This project aims to further develop federated learning for training AI models in autonomous vehicles. Additionally, it will investigate the prerequisites needed for implementing decentralized training solutions. The value will be that each vehicle can act as its own learning pipeline, leveraging onboard resources and only communicating local model improvements to be federated into a global model, while at the same time eliminating the exchange of actual data. By taking advantage of AI Sweden's state-of-the-art Edge Learning Lab and Zenseact's and Volvo Cars' development fleet and expertise, the project is conducted in an advanced, cooperative setting for experimentation and innovation. https://www.ai.se/en/project/federated-fleet-learning Duration: 2023-2025 Costs: 5.5 million SEK
Helsingbotica Community Robot	The project aims to contribute to the development of the vehicles of the future by carrying out tests of self-driving delivery robots in the city of Helsingborg. The primary deliverable from the project will be the development, implementation and evaluation of a delivery robot pilot. The project is testing autonomous neighbourhood robots in a residential area in Helsingborg where the robots will replace conventional vans to deliver goods directly to homes. The project will investigate ways to seamlessly integrate new technology, autonomous delivery robots, into existing distribution systems where we take into account the advantages and disadvantages of robots.

	https://www.vinnova.se/en/p/helsingbotica--community-robot/ Partners: Swedish National Road and Transport Research Institute (VTI), Helsingborgs municipality and the private companies Apotea, Best Transport and Hugo Delivery. Duration: 2024-2026 Costs: 3 million SEK
Major Projects and Program	**Description**
Drive Sweden https://www.drivesweden.net/en	Drive Sweden is a cross-functional collaboration platform that drives the development towards sustainable mobility solutions for people and goods. Members of Drive Sweden jointly develop and demonstrate efficient, connected and automated transport systems that are sustainable, safe and accessible for all. Drive Sweden is organised in thematic areas (among them "Digital infrastructure") and projects (among them KRABAT in which traffic signals were connected to the cloud). Drive Sweden is managed by Lindholmen, Science Park, It is a Strategic Innovation Program financed by the Swedish government. Duration: 2017-2028 Currently approx. 140 members Costs: Will be specified per project during duration.
InfraSweden2030 https://www.infrasweden2030.se/english/	InfraSweden2030 makes open calls for innovation in transport infrastructure, approximately once per year. The programme also organizes seminars and workshops with industry experts to promote collaboration and innovation in the Swedish transport infrastructure sector. One focus area is connected transport infrastructure. InfraSweden2030 is a Strategic Innovation Program financed by the Swedish government. Duration: 2015 - 2030 Costs: Will be specified per project
Northstar	The innovation hub Northstar launched by Telia and Ericsson gives industrial companies access to an innovation hub where they can explore the latest 5G technologies. The automation of transport is a key to lowering carbon dioxide emissions, reducing the number of workplace and traffic accidents and increasing productivity. https://www.telia.se/privat/om/5g/telia-och-ericsson-lanserar-innovationsprogrammet-northstar Duration: 2023 → Costs: Will be specified per project

Living lab for autonomous transportation in rural areas	In the Rödå-Tavelsjö region, a national living lab for autonomous transportation is being established. By working with the 2,015 residents, the project will identify transport needs and develop autonomous transport solutions. Expected outcomes include a comprehensive service design and engaging 50% of residents within three years. Local businesses and associations are already involved, aiming to create sustainable solutions that can inspire similar initiatives elsewhere. The project is coordinated by Swedish National Road and Transport Research Institute (VTI). https://www.vinnova.se/p/living-lab-for-autonoma-transporter-i-glesbygd/ Duration: 2023 - 2026 Costs: 8.2 million SEK

2.4.2. Progress since 2023

Description of progress in the area since 2023:

On September 26 2024, the Future 5G Ride project showcased key enablers for autonomous transport in Kista Innovation Park, focusing on safe and inclusive journeys. Visitors experienced riding in the driverless vehicle and learned about crucial aspects such as robustness, passenger interaction and the ability of 5G to serve various strict application requirements on demand - known as differentiated connectivity. Developments leading to these tests have included further development of the Traffic Tower concept from Applied Autonomy using a 5G connection to monitor and manage fleets of self-driving vehicles on public roads, as well as deploying sensors in infrastructure that enhance the traffic perception of self-driving vehicles by sharing real-time traffic data via a low latency reliable 5G network.

The NorthStar program is a purpose-built 5G network designed for innovation. Technically, it consists of a new 5G core network which is integrated with Telia's existing, public 5G network that is now being expanded across Sweden. Companies can also build local networks at, for example, test sites or research facilities and connect these to the innovation network. One area that is explored with the help of NorthStar is the so-called transport corridors with 5G coverage that Telia is developing with support from the EU. They involve self-driving vehicles traveling between different logistics hubs, for example a truck leaving a port, rolling along highways and eventually arriving at a fenced warehouse facility. Northstar is continuously updated with new functionality that is not yet available in the open 5G network. Such as network slicing to be able to deliver different types of services in parallel in the same network, or positioning for different types of assets will open up new areas of development for many industries.

A number of other projects within the Priority area IV have started during the period as described in table 2.4.1.

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

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	The trans-European *core* network for roads	access conditions for tunnels*	*100 %*	*There may be quality deficiencies.* *Applies to all subcategories*
		access conditions for bridges*	*100 %*	
		speed limits*	*100 %*	

- weight/length/width/height restrictions		overtaking bans on heavy goods vehicles*	*100 %*	
		weight/length/width/height restrictions*	*100 %*	
	The 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)	access conditions for tunnels*	*100 %*	
		access conditions for bridges*	*100 %*	
		speed limits*	*100 %*	
		overtaking bans on heavy goods vehicles*	*100 %*	
		weight/length/width/height restrictions*	*100 %*	
Subcategory: - one-way streets	*Road infrastructure in the cities at the centre of each Urban Node*	one-way streets*	*100 %*	
Subcategory: - freight delivery regulations	*Road infrastructure in the cities at the centre of each Urban Node*	freight delivery regulations*	*100 %*	
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 %*	*There are very few reversible lanes in Sweden. Data on driving direction is not currently shared as open data.*

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 %*	*Ongoing discussions at Swedish Transport Administration regarding what data will be included in TCP, such as Functional Road Classification from NVDB and other data from several sources.*
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 %*	
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 %* *[Note: if the network length is impossible to calculate, possibility to provide the number and % of boundaries*	

			of restrictions, prohibitions, etc.]	
1.2 Types of data on the state of the network:				
Subcategory: - road closures - lane closures - roadworks	*The trans-European core network for roads*	road closures**	*100 %*	
		lane closures**	*100 %*	
		roadworks**	*100 %*	
	The comprehensive trans-European network for roads	road closures**	*100 %*	
		lane closures**	*100 %*	
		roadworks**	*100 %*	
Subcategory: - temporary traffic management measures	*The trans-European core and comprehensive network for roads*	temporary traffic management measures**	*0 %*	*All data types in 1.2 above concerning the state of the network can be regarded as TMM. Sweden will report a percentage specifically on TMM when there is a harmonized interpretation of the content within the EU.*

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	*100 %*	*Data covers the entire road network but there may be quality deficiencies.* *Update from last inventory (2024) not yet available online. Applies to all subcategories.*
		information on safety and equipment of the parking area	*100 %*	
	The comprehensive trans-European network for roads	static data related to the parking areas	*100 %*	
		information on safety and equipment of the parking area	*100 %*	

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 %*	

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

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	*The core and comprehensive trans-European network for roads and other motorways not included in that network*	temporary slippery road**	*100 %*	*Swedish Transport Administration (STA) sends all listed SRTI data types for the full geographical coverage. Most of the data types comes from other data sources than STA´S own. Quality assurance are done*

- unmanaged blockage of a road				*before send out. Applies to all subcategories.*
		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)***	0 %	*Static traffic data of locations are available for all modes via API, web and apps for the 18 Urban nodes. There is though a lack of complete information regarding accessibility aspects for the access nodes.*
	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)***	0 %	*Static traffic data of location are available for all train stations and a majority of access nodes for other modes via API, web and apps. There is though a lack of complete information regarding accessibility aspects in many cases.*

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	Comment
Road safety-related minimum universal traffic information (SRTI) service	The ***core and comprehensive*** trans-European network for roads	95 %	Neither private or public stakeholders can detect all events for the the designated road network.

2.7. Other initiatives / highlights

2.7.1. Description of other national initiatives / highlights and projects not covered in priority areas 1 to 4:

Description of the relevant initiatives, their objective, timescale, milestones, resources, lead stakeholder(s) and status:

Initiatives	Description
Investigate proposals for horizontal collaborations and open data for increased fill rates in freight transports.	The Swedish Transport Administration was commissioned the investigation in 2018. The investigation runs throughout the decided planning period 2018-2029. The aim is to develop proposals for information exchange systems and open data for horizontal coordination in dialogue with the relevant stakeholders, as well as increased transport efficiency and reduced environmental impact through increased filling capacity. Two projects decribed below. The project "Transparent transport" was led by the City of Helsingborg from 2020 to the end of 2023. The sequel "Smarthome" consisted in starting development of a platform for data sharing. Tests mean showing how and in what way new technology and new services with connected delivery boxes can streamline both deliveries to the recipient and return flows from the same box. During the project period, 150 connected delivery points was established in Helsingborg to investigate how the home delivery system is affected. https://innovation.helsingborg.se/initiativ/digital-plattform-for-leveranser-transparenta-transporter/ Transport efficiency and degree of filling (TRYFFEL) is a project running from 2023 to 2026. The overall aim of the entire project is to develop and operationalize appropriate, reliable, accessible and cost-

	effective efficiency measures (KPI's) for analysis of the Swedish freight transport system. https://portal.research.lu.se/sv/projects/transport-efficiency-and-fillrate-analysis-and-suggested-measure-

2.7.2. Progress since 2023

Description of progress in the area since 2023:

N/A

3. KEY PERFORMANCE INDICATORS (KPIS)

KPIs will be reported separately by type of road network / transport network and nodes (where appropriate).

3.1. Deployment KPIs

3.1.1. Information-gathering infrastructures / equipment (road KPI)

Figures to be provided by type of network.

Figures to be provided by type of services, and where relevant by distinguishing between fixed and mobile equipment.

KPIs to be calculated by type of network.

- Length of road network type / road sections (in km) equipped with information-gathering infrastructures and the total length of this same road network type (in km):

  Road weather information gathering systems and Traffic volume services:

  97007 km out of 98369 km in total Comprehensive TEN-T (without urban nodes) + Motorways. 6308 km out of 6424 km of total TEN-T network.

- KPI = (kilometres of road network type equipped with information-gathering infrastructures / total kilometres of same road network type) x 100

  Road weather KPI and Traffic Volume services

  KPI = (97007/98369)*100 = 98.6 (total Comprehensive TEN-T (without urban nodes) + Motorways)

  KPI = (6308/6424)*100 = 98.1 (total Comprehensive TEN-T (without urban nodes))

3.1.2. Incident detection (road KPI)

Figures to be provided by type of network.

KPI to be calculated by type of network.

- Length of road network type / road sections (in km) equipped with ITS to detect incident and the total length of this same road network type (in km):

  The road network covered by fixed ITS equipment and where data is available is located in and around the three largest cities in Sweden: Stockholm, Gothenburg (West) and Malmö (South).

Total (km) = 4996: West = 2536, Stockholm = 1887, South = 573,

MCS Sthlm= 82,5, MSC West = 7,7, NSA Sthlm = 6, Wavetronix Sthlm = 6+9+12, Wavetronix South= 12.

- KPI = (kilometres of road network type equipped with ITS to detect incident / total kilometres of same road network type) x 100

  KPI, fixed (170 / 4996) *100 = 3,40

  KPI, mobile (4996/4996)*100 = 100

3.1.3. Traffic management and traffic control measures (road KPI)

Figures to be provided by type of network.

KPI to be calculated by type of network.

- Length of road network type / road sections (in km) covered by traffic management and traffic control measures and the total length of this same road network type (in km):

  The road network covered by fixed ITS equipment and where data is available is located in and around the three largest cities in Sweden: Stockholm, Gothenburg (West) and Malmö (South).

  Total (km)= 4996: West = 2536, Stockholm = 1887, South = 573,

  MCS Sthlm= 82,5, MSC West = 7,7, NSA Sthlm = 6, Wavetronix Sthlm = 6+9+12, Wavetronix South= 12

- KPI = (kilometres of road network type covered by traffic management and traffic control measures / total kilometres of same road network type) x 100

  KPI, fixed (MCS): = (170 / 4996) *100 = 3,40

3.1.4. Cooperative-ITS services and applications (road KPI)

Figures to be provided by type of network.

KPI to be calculated by type of network.

The implementation of C-ITS services is still in an early piloting phase. At the end of 2024 no C-ITS services or applications are in use on Swedish TEN-T road network or any other network. KPI is not available at present.

- Length of road network type / road sections (in km) covered by C-ITS services or applications and the total length of this same road network type (in km):

  0 km out of 98 369 (total Comprehensive TEN-T (without urban nodes) + Motorway)

  0 km out of 6 424 (total Comprehensive TEN-T (without urban nodes))

- KPI = (kilometres of road network type covered by C-ITS services or applications / total kilometres of same road network type) x 100

  KPI: (0/6424)*100 = 0

3.1.5. Real-time traffic information (road KPI)

Figures to be provided by type of network.

KPI to be calculated by type of network.

- Length of road network type / road sections (in km) with provision of real-time traffic information services and total length of this same road network type (in km):

  The Swedish Transport Administration provides real-time traffic information on the national roads and highways (98 369 km). The private actors have coverage where their customers travel which covers the entire road network.

- KPI = (kilometres of road network type with provision of real-time traffic information services / total kilometres of same road network type) x 100

  Real-time traffic information KPI = 100

3.1.6. Dynamic travel information (multimodal KPI)

Figures to be provided by type of network / node.

KPI to be calculated by type of network / node (where relevant); if relevant, indicate the proportion of services accessible to passengers with reduced mobility, orientation and/or communication.

- Length of transport network type (in km) with provision of dynamic travel information services and total length of this same transport network type (in km):

  Railway: 14 200 km provision of dynamic travel information services out of 14 200 km TEN-T railway network.

  Bus: Along the Swedish TEN-T road network, there are 51 urban regions with a population of at least 25 000 inhabitants (population data from the end of 2023). Dynamic travel information about bus transport is available from 48 of these regions, usually via travel information apps. Approximately 92 500 km provision of dynamic travel information services out of 98 369 Comprehensive TEN-T (without urban nodes) + Motorways.

- Number of transport nodes (e.g. rail or bus stations) covered by dynamic travel information services and total number of the same transport nodes: Railway stations:

  There are 594 passenger stations on the Swedish TEN-T railway network. Dynamic travel information is available for the whole TENT-T network and thereby for all stations. For 553 of these stations there are equipment connected to the grid that can receive traffic information.

It should be noted that the responsibility for travel information to travellers lies with the transport companies and it is a challenge to follow up on whether all of these provide information at the stations they are responsible for.

Bus transport: Along the Swedish TEN-T road network, there are 51 urban regions with a population of at least 25 000 inhabitants (population data from the end of 2023). Dynamic travel information about bus transport is available from 48 of these regions, usually via travel information apps, that includes the eighteen Urban Nodes in Sweden.

Regarding dynamic travel information for bus travels from digital signs there are such signs on parts of the bus network among ten out of eighteen Urban nodes. It is estimated that this constitutes approximately 20 percent of public bus transport in these Urban nodes.

A rough estimate across PTA´s in Swedish regions shows that less than 10 percent of all access nodes for bus have digital signs with dynamic information.

	Access nodes for bus		
Regions	With digital signs	Total number	Percentage (%)
Region Stockholm	1900	6100	31
Region West	1634	7719	21
Region South	300	3000	10
Region Uppsala	106	1000	10
Region Östergötland	100	1000	10
*Other regions	0	30000	0
*Total	4034	48819	8

*Total number approximated from Trafiklab API.

- KPI = (kilometres of transport network type with provision of dynamic travel information services / total kilometres of same transport network type) x 100

  Railway: KPI = 14200/14200 = 100%

  Bus:KPI=(92500/98369)*100=94.1%

- KPI = (number of transport nodes with provision of dynamic travel information services / total number of same transport nodes) x 100

  Railway: KPI = 553/594 = 93%

  Bus transport KPI = 48/51*100 = 94.1% (via dynamic travel information apps)

  Bus transport KPI = 4000/48800*100 = 8% (via dynamic digital signs)

3.1.7. Freight information (multimodal if possible or road KPI)

Figures to be provided by type of network / node.

KPI to be calculated by type of network / node (where relevant); if relevant, indicate the proportion of services accessible to passengers with reduced mobility, orientation and/or communication.

There are a limited number of dedicated freight services commonly available in Sweden. They cover the entire road network or a specific network such as TERN. In addition, there are locally provided services as an integrated part of different stakeholder's businesses. Development and deployment of cellular hybrid communications is expected to facilitate various priority services with freight relevance such as access management and capacity allocation.

Geofencing (access management) can be enabled by digital distribution of traffic regulations. For freight services two relevant regulations are speed limits and weight limit restrictions of roads. Static information is distributed in digital format to some extent today for these two regulations and ongoing work with geofencing aims to improve the quality and distribution format of this information so that it can be integrated into fleet management systems. Some heavy-goods vehicle manufacturers offer zone management or geofencing as a service so that the vehicles can act upon information to control access or speed in certain areas.

- Length of road network type / road sections (in km) with provision of freight information services and total length of this same road network type (in km):

  N/A

- Number of freight nodes (e.g. ports, logistics platforms) covered by freight information services and total number of the same freight nodes:

  N/A

- KPI = (kilometres of road network type with provision of freight information services / total kilometres of same road network type) x 100

  N/A

- KPI = (number of freight nodes with provision of freight information services / total number of same freight nodes) x 100

  N/A

3.2. Benefit KPIs

3.2.1. Change in travel time (road KPI)

Figures to be provided also include vehicle.km for the route / area considered.

KPI = ((travel time before ITS implementation or improvement – travel time after ITS implementation or improvement) / travel time before ITS implementation or improvement) x 100

There are no travel time measures before/after specific ITS installations available. Changes in traffic congestion index depends on several of factors e.g., congestion taxes in Stockholm.

Through the STRESS system, average travel times in our major cities can be calculated. The table below show average travel times for Stockholm, Gothenburg (West), and Malmö (South) during the period 2022 - November 2024.[8]

This estimate shows in an overall way how travel time has changed during the reported period for the busiest routes.

	Average travel times		
Year	Stockholm	Gothenburg	Malmö
2022	74,86	76,69	84,47
2023	73,64	75,36	85,19
2024	73,50	76,40	85,48

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

If possible, a distinction can be made between crashes resulting in deaths, serious injuries or slight injuries.

Figures to be provided also include vehicle.km for the route / area considered.

Automatic Traffic Safety Control (Automatisk trafiksäkerhetskontroll, ATK). There are no before/after measures on installations of road safety cameras in Sweden. During the period 2021--2023 the Swedish Transport Administration has established 389 places with Automatic Traffic Safety Control which together cover around 970 km of the road network, and in total 2484 cameras that cover around 6 200 km of the road network.

During the period 2021-2023 389 cameras have been dismantled in connection with improved road safety with other measures. The 389 new cameras have saved lives of 2 people between the years 2021-2023 according to assessment by the Administration.

- Number of road crashes resulting in deaths or injuries before ITS implementation or improvement:

  No pre-measurement available

- Number of road crashes resulting in deaths or injuries after ITS implementation or improvement:

  No post-measurement available

[8] STRESS – a system from Swedish Transport administration that includes congestion and travel times calculated from the major cities' congestion and travel time system.

3.2.3. Change in traffic-CO2 emissions (road KPI)

Please specify routes / areas where ITS has been implemented or improved. The length along or area within which the change in CO2 emissions is calculated shall be long or wide enough to be representative.

KPI = ((traffic-CO2 emissions before ITS implementation or improvement – traffic-CO2 emissions after implementation or improvement) / traffic-CO2 emissions before ITS implementation or improvement) x 100

N/A

A CO2 KPI on network level is not available. It is difficult to break out in what way ITS measures affect levels of CO2 emissions, since the effect will depend on several factors. The main issue is to find an adequate way to use existing ITS tools with other measures. However, values for CO2 affects from ATK and road-price scheme can be estimated, which is presented below.

Starting from 2022, the Swedish Transport Administration has developed a significantly more precise method for calculating CO2 effects from ATK. The previous method overestimated the effects and therefore the data is now significantly lower.

During spring 2023 a general estimate of the effects of the congestion tax in both Stockholm and Gothenburg were made. At that time, the Swedish Transport Administration estimated the effect to be about 0.75% of national transport emissions. For 2023, the total national transport emissions were 12.7 million tons, which means that the congestion tax would have reduced emissions by an estimated 95,000 tons of CO2 emissions in 2023 (compared to the same year in a scenario where we had not had a congestion tax, it should not be compared to 2022).

For Automatic Traffic Safety Control (Automatisk trafiksäkerhetskontroll, ATK) the estimated reduction in 2023 was 1556 tonnes CO2 emissions.

Year	Co2 effect from ATK (Tonnes)
2022	1 300
2023	1 556

3.3. Financial KPIs

ITS includes any types of systems and services together.

Annual public* investment in road ITS (as % of total transport infrastructure investments):

	Result 2022 (tSEK)	Result 2023 (tSEK)	Prognosis 2024 (tSEK)	Average per year (tSEK)
ITS Named Road Investments	25 000	28 030	8 673	20 568
ITS Trimming measures, road	57 102	179 530	230 449	155 694
ITS Regional plans, road	5 376	5 194	25 021	3 524
ITS Total	87 478	212 754	264 143	100 077

Total Named Road Investments	9 973 000	10 764 000	8 863 000	9 866 667
Total Trimming measures, road	1 405 000	1 167 000	1 454 000	1 342 000
Total Regional plans, road	2 208 000	1 950 000	1 623 000	1 927 000
Total	13 586 000	13 881 000	11 940 000	13 135 667
	Result 2022 (Percentage)	Result 2023 (Percentage)	Prognosis 2024 (Percentage)	Average per year (Percentage)
ITS percentage of Named Road Investments	0,3%	0,3%	0,1%	0,2%
ITS percentage of Trimming measures, road	4,1%	15,4%	15,8%	11,6%
ITS percentage of Regional plans, road	0,2%	0,3%	1,5%	0,2%
ITS percentage of Total	0,6%	1,5%	2,2%	0,8%

Annual public* operating and maintenance costs of road ITS (in euro per kilometre of network covered):

** public administrations or publicly-owned entities*

Where possible, please provide the same figures for private investments and costs.

	Result 2023 (SEK/km)	Prognosis 2024 (SEK/km)	Average per year (SEK/km)	Total cost 2023 (Million SEK)	Total cost 2024 (Million SEK)
Cost of reinvestment for ITS and ATK on TEN-T	29 628	31 664	30 646	189	202
Cost of maintenance for ITS and ATK on TEN-T	40 685	41 622	155 694	260	266

ANNEX II

Key performance indicators (KPIs)

	KPI name	Geographical scope	Timeline
Deployment KPIs	Information-gathering infrastructures / equipment (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis
	Incident detection (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis
	Traffic management and traffic control measures (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis
	Cooperative-ITS services and applications (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis
	Real-time traffic information (road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis

	Dynamic travel information (multimodal KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + transport nodes + primary roads	Mandatory in 2028 (voluntary before)
		Entire transport network	Additional KPI to be provided on voluntary basis
	Freight information (multimodal if possible or road KPI)	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + transport nodes + primary roads	Mandatory in 2028 (voluntary before)
		Entire transport network	Additional KPI to be provided on voluntary basis
Benefit KPIs	Change in travel time (road KPI)	Core, extended and comprehensive TEN-T + motorways	Mandatory in 2028 (voluntary before)
	Change in the number of road crashes resulting in deaths or injuries (road KPI)	Core, extended and comprehensive TEN-T + motorways	Mandatory in 2028 (voluntary before)
	Changes in traffic-CO2 emissions (road KPI)	Core, extended and comprehensive TEN-T + motorways	Mandatory in 2028 (voluntary before)
Financial KPIs	Annual public investment in road ITS *(+ figures for private investments where possible)*	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis
	Annual public operating and maintenance costs of road ITS *(+ figures for private costs where possible)*	Core, extended and comprehensive TEN-T (without urban nodes) + motorways	Mandatory in 2025
		Urban nodes from TEN-T + primary roads	Mandatory in 2028 (voluntary before)
		Entire road network	Additional KPI to be provided on voluntary basis