ITS REPORT

Spain 2023

MINISTERIO
DEL INTERIOR

DGT
Dirección General
de Tráfico

Content

ILUSTRACIONES

TABLES

ACRONYMS

ACOTRAM	Asistente para el Cálculo de Costes del Transporte de Mercancías por Carretera - Assistant for the Calculation of Road Freight Transport Costs
ADAS	Advanced Driver Assistance Systems
ADT	Average Daily Traffic
AEMET	Agencia Estatal de Meteorología - Spanish Meteorological Agency
AI	Artificial Intelligence
AID	Automatic Incident Detection
API	Application Programming Interface
APP	Application
AVI	Automatic Vehicle Identification
BOE	Boletín Oficial del Estado - Official State Bulletin
CAM	Content Aggregation Model
CCAM	Connected, Cooperative and Automated Mobility
CCTV	Closed Circuit Television
CEF	Connecting Europe Facility
C-ITS	Cooperative Intelligent Transport Systems
CIVICAT	Centro de Información Vial de Cataluña - Catalonia's Road Information Centre
CONCORDA	Connected Corridors Driving Automation
COPSV	Centro de Operaciones y Seguridad Vial - Road Safety and Operations Center
CRTM	Consorcio Regional de Transportes de Madrid - Madrid's Regional Transport Consortium
CVT	Controlador de Velocidad en Travesías - Crossing Speed Controller
DAS	Distributed Acustic Sensor
DGC	Dirección General de Roads - General Directorate of Roads
DGT	Dirección General de Tráfico - General Directorate for Traffic
DGTT	Dirección General de Transporte Terrestre - General Directorate of Land Transport
DT	Departamento de Tráfico y Seguridad del País Vasco - Traffic and Security Department of the Basque Country

DUM	Distribución Urbana de Mercancías - Urban Distribution of Goods
DVIT	Digital Vision Touch
EATA	European Automotive Telecom Alliance
EC	European Commission
EETS	European Electronic Toll Service
EFC	Electronic Fee Collection
EMT	Empresa Municipal de Transportes - Town Hall´s Transport Company
EMV	Europay Mastercard Visa
EN	European Norm
ETC	Electronic Toll Collection
EU	European Union
EU EIP	EU European ITS Platform
FCD	Floating Car Data
GEIS	Gestor de Incidencias en la Explotación – Operational Incident Manager
GIS	Global Positioning System
GPS	Global Positioning System
GTFS	General Transit Feed Specification
HD	High Definition
HOV	High Occupancy Vehicle
I2V	Infrastructure to Vehicle
IDE	Integrated Development Environment
IDS	Intrusion Detection System
IOS	iPhone Operative System
IoT	Internet of Things
IRS	Interest Rate Swap
ISO	International Organization for Standardization
ITS	Intelligent Transport Systems
KPI	Key Performance Indicators

LINCE	Localizador de Incidencias en las Carreteras de España - Incident Locator on Spanish Roads
LOPD	Ley Orgánica de Protección de Datos - Spanish Data Protection Law
LOS	Levels Of Service
LPR	License Plate Recognition
LTE	Long Term Evolution
MAC	Message Authentication Code
MaaS	Mobility as a Service
MAM	Maximum Authorized Mass
MEAT	Máquina Expendedora Automática de Títulos - Ticket Vending Machine
MTMS	Ministerio de Transportes y Movilidad Sostenible - Ministry of Transport and Sustainable Mobility
MMTIS	Multi Modal Travel Information Services
MNO	Mobile Network Operators
MNT	Modelo Nacional de Transportes – National Transport Model
NAP	National Access Point
NFC	Near Field Communication
NNTT	New Technologies
OBE	On Board Equipment
OCR	Optical Character Recognition
ONCE	Organización Nacional Ciego Españoles - Spanish National Blind Organisation
OPE	Operación Paso del Estrecho - Paso del Estrecho Special Operation
OPP	Operación Paso de Portugal - Paso de Portugal Special Operation
OTLE	Observatorio del Transporte y la Logística en España - Transport and Logistics Observatory of Spain
O/D	Origin-Destination
PAM	Predictive Analytics Module
PITVI	Plan de Infraestructuras, Transporte y Vivienda 2012 - 2024 - Infrastructure, Transport and dwelling national plan 2012 – 2024
PPP	Public Private Partnership

PSA	Support Action Programme
PSAPs	Public Safety Answering Points
QR	Quick Response
RaaS	Renfe as a Service
RACC	Royal Automobile Club of Catalonia
RDS	Radio Data System
RENO	Ratificación de Expedientes de Obra - Ratification of Work Expeditions
RGB	Red Green Blue
RIMP	Red de Itinerarios para Mercancías Peligrosas - Itineraries Network for Dangerous Goods
RNE	Radio Nacional de España - Spanish National Radio
RTTI	Real Time Traffic Information
RUN	Ronda Urbana Norte - North Urban Ring
SAM	Secure Access Module
SCADA	Supervisory Control And Data Acquisition
SCT	Servei Català de Tránsit - Catalan Transit Service
SDCTU	Sistema Distribuido de Control de Tráfico Urbano - Distributed Urban Traffic Control System
SHP	Shapefile
SEITT	Sociedad Estatal de Infraestructuras de Transporte Terrestre - State Society for Land Transport Infrastructure
SGIP	Servicio de Información al Pasajero – Passengers Information System
SGRAF	Supervisor Gráfico – Graphic supervisor
SIF	Sistema de Información de Frontera - Borderline Information System
SIM	Subscriber Identity Module
SIRDE	Sistema de Información para Registro de Datos de Expediciones - Management Information System for Recording Data of Dispatches
SIT	Sistema de Información del Transporte - Transport Information System
SMS	Short Messaging Service
SRTI	Safety Related Traffic Information

STT	Servicios Territoriales - Territorial Services
TCA	Tramos de Concentración de Accidentes - Accident Concentration Sections
TEN-T	Trans-European Transport Network
TMC	Traffic Management Centre
TRAZA	Tramitación de Autorizaciones - Processed Authorizations
TTP	Tarjeta de Transporte Público – Public Transport Card
UAV	Unmanned Aerial Vehicle
UC	Use Cases
UITP	Unión Internacional de Transporte Público - International Union of Public Transport
UN	United Nations
UNE	Una Norma Española – A Spanish Regulation
V2C	Voice to Control
V2I	Vehicle to Infrastructure
V2V	Vehicle to Vehicle
VEOS	Visualizador Geolocalizado de Sucesos - Events Geolocated Display
VMS	Variable Message Signs
WRD	Winter Road Dashboard
XML	Extensible Markup Language

1 Introduction

The objective of this document is to develop the National Report on the progress in the deployment of Intelligent Transportation Systems (ITS) in Spain in accordance with European Directive 2010/40/EU[1].

Considering the aforementioned Directive 2010/40/EU and, in particular, the third section of Article 17, each Member State must report with a periodicity of three (3) years on the progress made in the implementation of the priority actions, contemplated in the first paragraph of Article 17.

In accordance with Royal Decree 662/2012[2] and, in compliance with the ITS Directive, the Central Traffic Headquarters is established as the autonomous body in charge of reporting to the European Commission (EC) on the progress made in ITS activities and projects. related to priority actions.

In August 2011, Spain reported on the status of progress in the implementation of technological applications for traffic and transportation. In August 2012 it also reported to the European Commission on national ITS ambitions, plans and projects over the next five (5) years. As a result of these reports, in 2014, Spain issued its first triannual report and later, in 2017 and 2020, it sent a second and third updated report with the progress made in that period of time. Now, in 2023, this fourth report shows the progress made since 2020.

This document aims to gather and organize existing information regarding Spain's progress in the context of intelligent transportation systems in a comprehensive manner.

Illustration 1. Mediana separadora. Fuente: Elaboración propia

[1] DIRECTIVE 2010/40/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 7 July 2010 laying down the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other transport modes-

[2] ROYAL DECREE 662/2012 of 13 April, establishing the framework for the deployment of Intelligent Transport Systems (ITS) in the road transport sector and for interfaces with other transport modes.

1.1 Structure of the document

In line with the guidelines issued by the European Commission services, the document is structured in three main blocks, a section mentioning those who contributed to make this report possible, a reference section and an annex with contact information as shown in the diagram below:

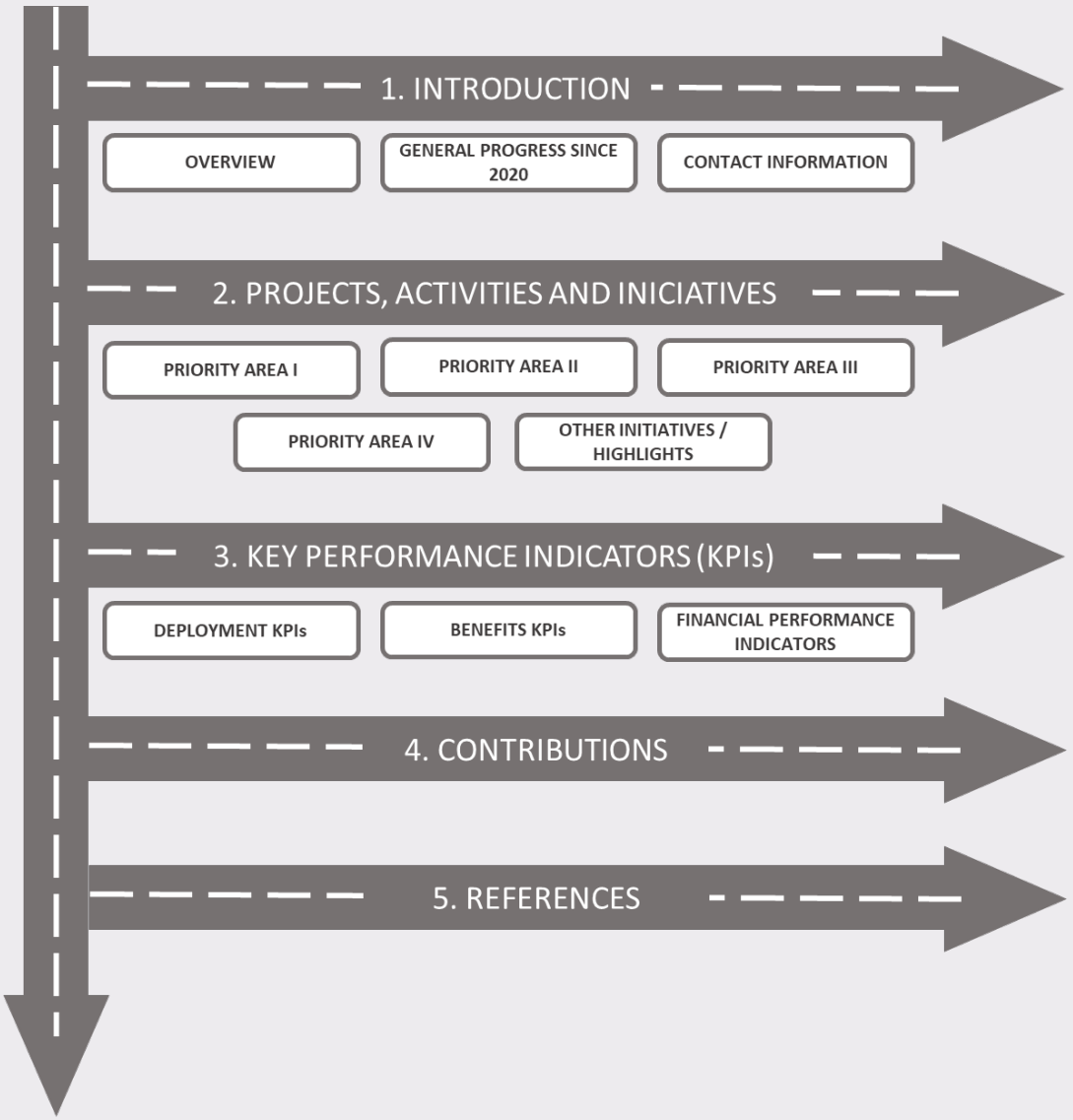

Illustration 2. Structure of the document. Source: Own Elaboration

The first block consists of a brief introduction of the main national activities and projects in which Spain participates, as well as their progress since 2020.

With the activities and progress already introduced, they are classified according to Annex I: Priority areas and Actions of Directive 2010/40/EU and are included in the second block with a more detailed description of each of them.

The third block of the document focuses on the calculation of the efficiency indicators (KPIs) related to ITS, explaining the methodology used for their calculation and the results obtained for each classification of the road network in Spain.

1.2 Overview of national activities and projects

The deployment of intelligent transport systems has been very significant in Spain for decades, as well as the deployment of applications and services that accompany citizens on their journeys. There are four main objectives of this deployment:

- to provide safety,
- to reduce delays in order to predict travel times more accurately,
- to improve the quality of road transport and
- to enhance the road experience for users.

The figures reflect the magnitude of the services provided by the applications and systems; for example, in 2019 more than 427 million long-distance trips were monitored on 15,770 km of the Spanish road network with ITS equipment. In total, 165,624 km of roads are managed at the state level.

In the last three (3) years, different trends have been observed that affect the daily movements of citizens and the transport of goods. The digitalization, irruption and improvement of technologies such as the Internet of Things (IoT), automation, Big Data, the exponential increase of people connected as a result of the evolution of telephones, smartwatches and other intelligent devices, vehicle connectivity and the improvement of mobile communications (4G, 4.5G, 5G), are being fundamental and decisive elements in the restructuring of activities and approaches, among which we can highlight the deployment of priority actions established in the ITS Directive.

For the preparation of this report, the entities participating in Working Group 56 of the Council on Traffic, Road Safety and Sustainable Mobility were consulted. The contributions received strengthen the content of the report.

All the initiatives and projects included in this report are developed under the vision, scope and activities or strategic plans at national, regional and local levels, highlighting:

- Action plan 2022-2023 (Ministry of the Interior – DGT)
- Infrastructure, Transport and Housing Plan 2012 - 2024 (Ministry of Transport, Mobility and Urban Agenda)
- Road Safety Plan 2021-2023 of the Catalan Traffic Service (SCT)
- National Pact for Safe and Sustainable Mobility (government agreement of the Generalitat to face mobility challenges, in line with the EU, vision zero objective and fight for climate change)
- Safe, Sustainable and Connected Mobility Strategy 2030 (Ministry of Transport and Sustainable Mobility): among the activities carried out by the Ministry of Transport and Sustainable Mobility, the development of the Safe, Sustainable and Connected Mobility Strategy 2030 stands out. The Mobility Strategy is a roadmap that will allow Spanish society and economy to advance towards the new paradigm of mobility, facing the recent challenges of the sector, related to the massive introduction of technology in transport, the need for decarbonization of the economy and the increasing concentration of population in urban and peri-urban centers, with the consequent challenges of congestion and depopulation for the rural world and medium-sized cities. The Safe, Sustainable and Connected Mobility Strategy is a long-term framework

document, with a horizon of 2030, which will be implemented in the short and medium term. To this end, the Safe, Sustainable and Connected Mobility Strategy is structured into 9 axes, with more than 40 lines of action and more than 150 specific measures. One of its main objectives is Intelligent Mobility, dedicating one of the nine strategic axes of action to it. This axis deals mainly with the use of technology to support mobility policies, facilitating mobility as a service (MaaS) through the publication of open data, commitment to the intelligent management of infrastructures, terminals and stations, and automation of transport and logistics, the promotion of connected and autonomous vehicles (cars, but also boats or trains), the use of the GALILEO system in mobility, the use of drones and the promotion of entrepreneurship and R&D&I in mobility. However, digitalization is one of the key themes of the Strategy, and other axes of the Strategy, such as those related to Safe Mobility and Smart Intermodal Logistics Chains, also contain measures that refer to intelligent transport systems. The Safe, Sustainable and Connected Mobility Strategy 2030 began to be developed in 2019. For the regulatory development of some of the measures contained in the Mobility Strategy, the Sustainable Mobility and Financing Law Project has been approved and sent to the Cortes. Transportation, so that the law can be approved and come into force before the end of 2023.

Illustration 3. Strategic plans at national, regional and local level. Source: Own elaboration based on documentation mentioned above

A complete list of reference documents is included in the final section "References".

The following table shows the main reference projects that have consolidated the activities of the National Progress Report.

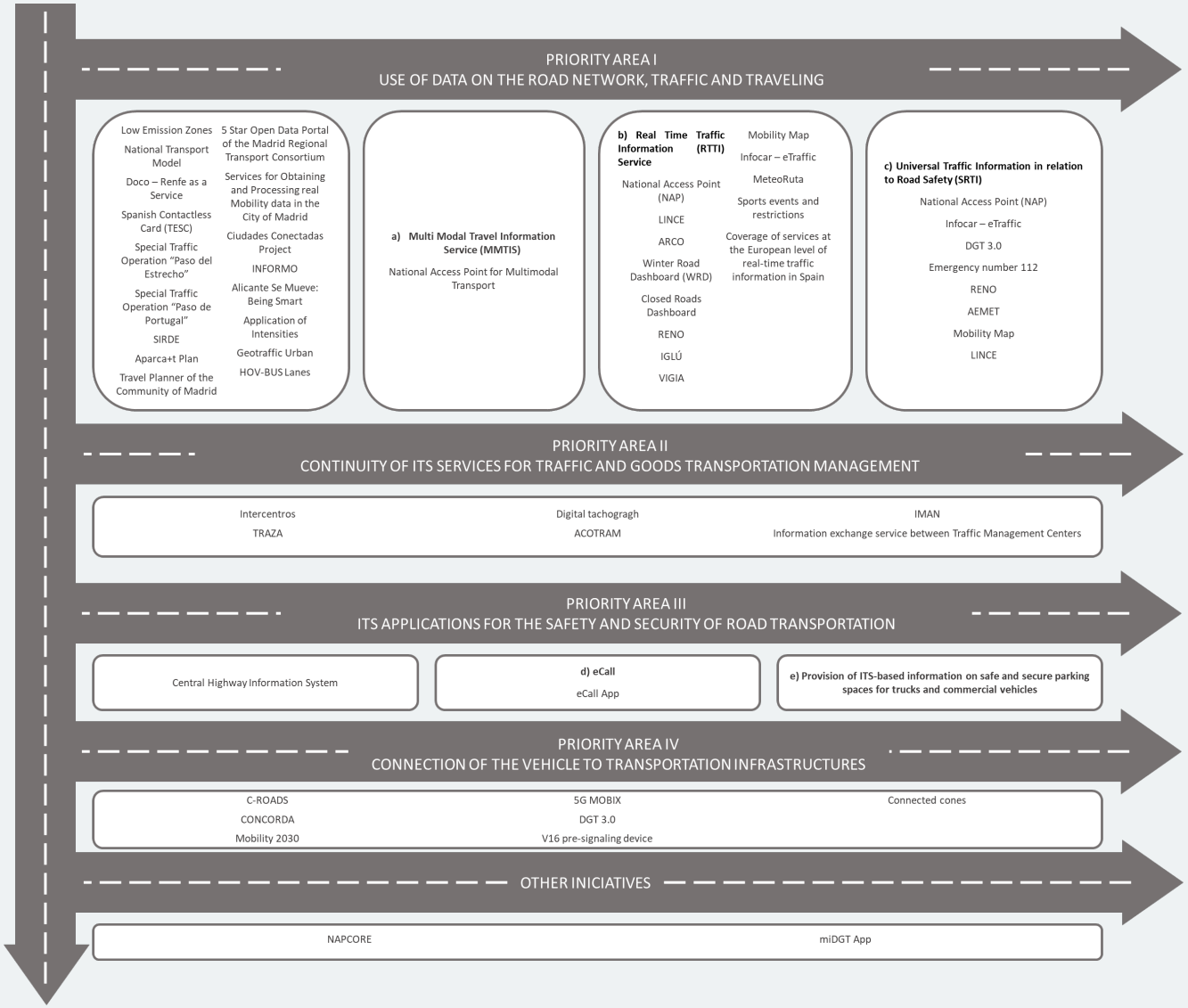

Illustration 4. Estructura general. Fuente: Elaboración propia

1.3 General Progress since 2020

The information on ITS progress in Spain since 2020, and in accordance with what is included in the priority actions of the ITS Directive, has been structured in such a way that the format used for the 2014, 2017 and 2020 Reports is maintained, and is This makes it possible to compare the information between years and show the evolution both for the services that existed in the past and for the new ones that are included in the current document.

Table 1. Functional areas and ITS services analysed in overall progress since 2020. Source: Own Elaboration

FUNCTIONAL AREA	ITS SERVICE
Traffic information	Traffic events and incidents
	Traffic flow (Levels of Service - LOS)
	Travel times
	Information of speed limits
	Driving restrictions
	Images or video distribution
	Weather related information
	Itinerary planning
	Information exchange
Traffic and mobility management	Dynamic speed management
	Prohibition of truck take-over
	Implementation of reversible lanes
	Hard shoulder use
	Management of high occupancy lanes
	Ramp metering
	Dynamic management of driving restrictions in mass movements and adverse weather conditions
	Tunnel management
	Traffic management plans
	Dynamic management of urban traffic plans
	Traffic light priority systems for public transport
	On demand public transport
	Public bicycle service management
	Carpooling and car sharing
	Weight control
Security and emergency management	eCall or incident management
	ADAS
	Remote diagnostics
	Vulnerable users
Monitoring (compliance)	Speed control
	Red light control
	Access control
	Digital tachograph
	Video surveillance system in public transport
	EFC (Electronic Fee Collection) and road pricing

FUNCTIONAL AREA	ITS SERVICE
Telematic payment and electronic toll collection (ETC)	ETC compliance
	ETC infringements
	Mobile phone payments and card verification on public transport
	ETC application
	Shadow toll
Freight and fleet	Information and reservation services on safe and secure truck parking places
	Dangerous Goods Traffic Management
	Dangerous Goods Monitoring
	Special transport management
	Urban and interurban logistics
	Lean and green logistics
Transport facilities	ITS deployment and demand studies (ITS Electronic Product Supply Catalogue, ITS Action Plan)
	Exploitation Support Systems (ESS)
	Travel planning (including door-to-door planner)
	Intermodal transport management
	E-ticketing
	Transfer
	Integration of data and information in a single architecture
	Traveller information

The following sections include a series of tables, disaggregated and linked to each of the functional areas and ITS services, which indicate the current situation of each service in Spain. The colour-scale shown on the table below has been used to represent 4 levels of deployment and maturity.

Table 2. ITS level of deployment colour scale. Source: Own Elaboration

	Test level, pilot projects, research projects or preliminary studies
	Service implemented in certain corridors or specific cities
	Service implemented in a large part of the territory or area where it is necessary
	Information not available

The information collected in the following tables is the result of a massive consultation launched to all service providers (both public and private), boroughs with more than 50,000 inhabitants, concessionaires, bodies, entities and associations at a national level related to the subject. The aim is to reflect the true state and evolution of the ITS field in Spain since 2020 in the most realistic way possible.

1.3.1 Traffic information

1.3.1.1 Traffic events and incidents

Table 3: General progress on traffic events and incidents. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	VMS	Access and ring roads of big cities. Some sections of the most representative interurban road network.					
	Web servers	The entire interurban network					
	Information phone numbers (011), SMS, 012, …	The entire urban and interurban road network					
	Interactive digital televisions	The entire interurban network					
	NAP	The entire interurban and part of the urban road network					
DGT	Radio (via RNE)	The entire interurban network					
Big Cities (Madrid, Castellón, Sevilla, Bilbao, Vitoria, León, …)	VMS, social networks, Servers web, APPs. NAP (Madrid City Council)	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Gijón, Sant Boi de Llobregat, Terrassa, …)	VMS, CCTVs, APPs, Web servers	Urban road network					
Public and private ITS service providers	Mobile APPs NAP (TomTom)	The entire interurban and part of the urban road network					
Toll operators (e.g. motorways)	Pharos, VMS, web, APP, DATEX II	High-capacity network					
Renfe Services	APP and mobility platform	Railway and multimodal transport network of other public and private transport modes					

1.3.1.2 Traffic flow (Levels of Service - LOS)

Table 4: General progress on Traffic flow (Levels of Service - LOS). Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	NAP, Servers web, APPs, Social Networks	Access and ring roads of big cities. Some sections of the most representative interurban road network.					
Big Cities (Madrid, Castellón, Sevilla, Bilbao, Vitoria, León, …)	VMS, social networks, Servers web, APPs. NAP (city council Madrid)	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Gijón, Sant Boi de Llobregat, Terrassa, …)	Loops, PMVs and Web Servers	Urban road network					
Public and private ITS service providers	Google, INRIX, etc.	The entire urban and interurban road network					
Toll operators (e.g. motorways)	VMS, web, APP, DATEX II	High-capacity network					

1.3.1.3 Travel times

Table 5: General progress on Travel times. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	VMS	Access and ring roads of big cities. Some sections of the most representative interurban road network.					
	NAP	The entire interurban and part of the urban road network					
DGT	Web servers	Access and ring roads of big cities.					
Big Cities (Madrid, Castellón, Sevilla, Bilbao, Vitoria, León, …)	VMS, SSNN, Web servers, APPs.	Urban road network					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Some municipalities with more than 50,000 inhabitants (Albacete, Gijón, Sant Boi de Llobregat, Terrassa, …)	VMS, LPRs, Web servers	Urban road network					
Public and private ITS service providers	Mobile APPs and Big Data Platforms (e.g. Indra-TomTom)	The entire interurban and part of the urban road network					
Toll operators (e.g. Motorways, SEITT, National Delegation of Toll Roads)	VMS, web, APP	High-capacity network					
Renfe Services	APP and mobility platform	Railway and multimodal transport network of other public and private transport modes					

1.3.1.4 Information of speed limits

Table 6: General progress on Information of speed limits. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	VMS	Access and ring roads of big cities. Some sections of the most representative interurban road network.					
	Web servers	The entire interurban road network					
	NAP	The entire interurban and part of the urban road network					
Big Cities (Madrid, Castellón, Sevilla, Bilbao, Vitoria, León, …)	VMS, Informative pedagogical speed signals. NAP (City Council of. Madrid)	Urban road network					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Some municipalities with more than 50,000 inhabitants (Albacete, Gijón, Sant Boi de Llobregat, Terrassa, …)	VMS, radars	Urban road network					
Public and private ITS service providers	Mobile APPs	The entire interurban and part of the urban road network					
Toll operators (e.g. motorways)	VMS, APP, web	High-capacity network					

1.3.1.5 Driving restrictions

Table 7: General progress on driving restrictions. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	VMS, Web servers and news channels	Access and ring roads of big cities. Some sections of the most representative interurban road network.					
	NAP	The entire interurban and part of the urban road network					
Big Cities (Madrid, Castellón, Sevilla, Bilbao, Vitoria, León, …)	VMS, Social Networks, Web servers, APPs. NAP (Madrid City Council)	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Terrassa, …)	VMS, LPRs, Web servers	Urban road network					
Public and private ITS service providers	Mobile APPs	The entire interurban and part of the urban road network					
Toll operators (e.g. Motorways, SEITT, National Delegation of Toll Roads)	VMS, web, APP, DATEX II	Urban road network					
Renfe Services	APP and mobility platform	Railway and multimodal transport network of other public and private transport modes					

1.3.1.6 Images or video distribution

Table 8: General progress of image or video distribution. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	Web servers, Mobile APPs	Access and ring roads of big cities. Some sections of the most representative interurban road network.					
	NAP	The entire interurban and part of the urban road network					
Big Cities (Madrid, Castellón, Sevilla, Bilbao, Vitoria, León, …)	CCTVs, Social networks, Web servers, APPs.	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Gijón, Terrassa, …)	CCTVs, Web servers, Local Police	Urban road network					
Toll operators (e.g. Motorways, SEITT, National Delegation of Toll Roads)	Web servers through DGT	High-capacity network					

1.3.1.7 Weather – related information

Table 9: General progress on weather-related information. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT, DGC	VMS, Web servers and Mobile APPs	Specific points of the interurban network					
Big Cities (e.g. Madrid)	VMS and Social networks with information from AEMET	High-capacity network					
Some municipalities with more than 50,000 inhabitants (Albacete, Terrassa, …)	VMS	Urban road network					
Public and private ITS service providers	Mobile APPs	The entire interurban and part of the urban road network					
Toll operators (e.g. Motorways, MITMA, SEITT, National Delegation of Toll Roads)	Web, APP.	High-capacity network					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Renfe Services	APP and mobility platform	Railway and multimodal transport network of other public and private transport modes					

1.3.1.8 Itinerary planning

Table 10: General progress on Itinerary Planning. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	Web servers and Mobile APPs	The entire interurban road network					
Big Cities (e.g. Madrid)	EMT MaaS Madrid	The entire road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Terrassa, …)	VMS and TMC software	Urban road network					
Public and private ITS service providers	Mobile APPs	The entire interurban and part of the urban road network					
Toll operators	Web, APP.	High-capacity network					
Renfe Services	APP and mobility platform	Railway and multimodal transport network of other public and private transport modes					

1.3.1.9 Information Exchange

Table 11: General progress on Information Exchange. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT, DGC	DATEX II, XML and text files	The entire interurban road network					
Big Cities (Madrid, Castellón, Sevilla, Bilbao, Vitoria, León, …)	APIs, Open Data Systems, XML, Cloud IDE	The entire road network					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Public and private ITS service providers	Mobile APPs	The entire interurban and part of the urban road network					
Toll operators (e.g. Motorways, MITMA, SEITT, National Delegation of Toll Roads)	DATEX II	High-capacity network					

1.3.2 Traffic and Mobility management

1.3.2.1 Dynamic speed management

Table 12: General progress on dynamic speed management. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT	VMS, Web servers	Specific sections of the interurban and peri-urban network					
Big Cities (e.g. Madrid)	VMS, Web servers	High-capacity network					
Toll operators	VMS, Web servers	Specific sections of the peri-urban network					

1.3.2.2 Prohibition of truck take-over

Table 13: General progress on the Prohibition of truck take-over. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, DT	VMS, Web servers, New channels	Specific sections of the interurban network					
Toll operators	VMS, Web servers, New channels	Specific sections of the interurban network					

1.3.2.3 Implementation of Reversible lanes

Table 14: General progress on the Implementation of Reversible Lanes. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	VMS, Web servers, New channels	Specific sections of the interurban network					

1.3.2.4 Hard shoulder use

Table 15: General progress on the hard shoulder use. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	VMS	Specific sections of the interurban network					

1.3.2.5 Management of high-occupancy lanes

Table 16: General progress on the Management of high-occupancy lanes. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT	VMS, Web servers, New channels	20 km section in Madrid on the A-6 HOV lane					
SCT	VMS, Web servers, New channels	High Occupancy Vehicle Lane project on C-58 completed (October 2012: HOV+3; March 2013 HOV+2; September 2014 HOV +2 (1+1 route)					

1.3.2.6 Ramp metering

Table 17: General progress on Ramp metering. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT	VMS, Web servers, New channels	A-5 and A-1 peri-urban motorways in Madrid M-40 evaluation					
Big cities (e.g. access to Seville)	Traffic Management System SIT 3	Urban road network					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Integrators, installers and maintainers (e.g. Kapsch)	Services V2X	AP-7 (C-Roads)					

1.3.2.7 Dynamic management of driving restrictions in mass movements and adverse weather conditions.

Table 18: General progress on Dynamic management of driving restrictions in mass movements and adverse weather conditions. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	VMS, Web servers, New channels NAP	Interurban network and ring roads in the metropolitan areas of big cities: Madrid and Barcelona					
Big cities (e.g. Madrid and Barcelona)	VMS, Web servers, New channels NAP	The entire road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Aranjuez, Terrassa, ...)	VMS	Low Emission Zone in pollution episodes					

1.3.2.8 Tunnel Management

Table 19: General progress on Tunnel management. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGC	VMS, Web servers, New channels	Tunnels of the urban and interurban network					
Big cities (e.g. Madrid and Barcelona)	VMS, Web servers, New channels	Tunnels of the urban and interurban network					
Toll operators	HORUS	High-capacity network					

1.3.2.9 Traffic management plans

Table 20: General progress on Traffic management plans. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	
DGT, SCT, DT	LOS algorithms, traffic conditions, AID and travel times. VMS, Web servers, New channels and mobile APPs	In all the Traffic Management Centres, the interurban road network in Spain					
Big cities (Madrid, Sevilla, San Sebastián, Vitoria, Lleida, ...)	Management systems SDCTU, SIT3, Optimus, APPs, Web servers	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Aranjuez, Terrassa, ...)	Traffic management systems	Urban road network					
INECO	Transport model	The entire interurban network					

1.3.2.10 Dynamic management of urban traffic plans

Table 21: General progress on Dynamic management of urban traffic plans. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (Madrid, Sevilla, San Sebastián, Vitoria, Lleida, ...)	Management systems SDCTU, Optimus, Centralised crossings, Adaptive system ITACA	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Aranjuez, Terrassa, ...)	Control Centre Software Centralised crossings Modification of Traffic Light Work Plans	Urban road network					

1.3.2.11 Traffic light priority systems for public transport

Table 22: General progress on Traffic light priority systems for public transport. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (Madrid, Sevilla, San Sebastián, Vitoria, Lleida, ...)	Control Centre Software Specific traffic lights for Public Transport	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Terrassa, ...)	Control Centre Software Specific traffic light intersections with BUS priority	Urban road network					

1.3.2.12 On request public transport

Table 23: General progress on request public transport. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (Madrid, Sevilla, San Sebastián, Vitoria, Lleida, ...)	On-board equipment as operational aids, information screens, reservation centre, tools for making reservations (APP, web, SMS, telephone)	Urban public transport					
Some municipalities with more than 50,000 inhabitants (Albacete, El Ejido, Molina de Segura, ...)	Reservation service via APP and telephone	Urban public transport					

1.3.2.13 Public bicycles service management

Table 24: General progress on Public bicycles service management. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (Madrid, Castellón, León, San Sebastián, ...)	Equipped stations - bike racks - conventional and electric bikes; Contactless card; Intramodality with other modes of public transport; Web servers; News channels: web portals; APPs	Urban road network					
Some boroughs with more than 50,000 inhabitants (Albacete, Gijón, Molina de Segura, ...)	Web servers; News channels: web portals; APPs	Urban road network					

1.3.2.14 Car-pooling and car-sharing

Table 25: General progress on Car-pooling. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, DT	VMS, Web servers and mobile APPs	Specific sections of the interurban road network					
Private service providers with information provided by the Administration or other servers	Mobile APPs	The entire road network					

Table 26: General progress on Car-sharing. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. Madrid)	Web sites and mobile APPs	Urban road network					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Some municipalities with more than 50,000 inhabitants (Albacete, Gijón, Molina de Segura, ...)	In study	Urban road network					
Private service providers with information provided by the Administration or other servers	Mobile APPs	The entire road network					

1.3.2.15 Weight control

Table 27: General progress on Weight Control. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT, DGC	Restriction control system for vehicles with MAM> 7,500 kg	The entire road network					
Big cities (e.g. Sevilla)	Unauthorized MAM, control system in RUN	Urban road network					

1.3.3 Security and emergency management

1.3.3.1 eCall or incident management

Table 28: General progress on eCall or incident management. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
112 PSAPs, DGT, MNO (Mobile Network Operators)	Mobile communication network, PSAP (Public Safety Answering Points) and information exchange protocols	The entire road network					
DGT, SCT, DT, DGC	NAP, VMS, CCTVs, Web servers, APPs, Social Networks	Access and ring roads of big cities. Some sections of the most representative interurban road network.					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. Madrid, Vitoria, ...)	NAP, Web portals and mobile APPs	Urban road network					
Toll operators (e.g. motorways)	Web, APP.	High-capacity network					
Renfe Services	APP and mobility platform	Railway and multimodal transport network of other public and private transport modes					

1.3.3.2 ADAS

Table 29: General progress on ADAS. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, Barcelona City Council	Pilot projects (e.g. Autonomous Ready)	Urban and interurban road network					
Toll operators (e.g. motorways)	Fleet vehicles	High-capacity network					

1.3.3.3 Remote diagnostics

Table 30: General progress on Remote diagnostics. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	Alarm and communication failure management system	Access and ring roads of big cities. Some sections of the most representative interurban road network					
Big cities (e.g. Madrid)	Alarm and communication failure management system	Urban and interurban road network					

1.3.3.4 Vulnerable users

Table 31: General progress on Vulnerable users. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT	Multiple projects focused on improving Road Safety for cyclists, motorcyclists and pedestrians (dynamic signage with presence detectors, devices to improve the visibility of vulnerable users, etc.)	Access and ring roads of big cities. Some sections of the most representative interurban road network.					
Big cities (e.g. Madrid, San Sebastián)	Parking card for people with reduced mobility. Fleet of accessible buses. Accessibility of metro and suburban stations.	Urban and interurban road network					
Renfe Services	Special vehicle service for people with functional diversity	Railway network					

1.3.4 Monitoring (compliance)

1.3.4.1 Speed control

Table 32: General progress on Speed Control. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	Speed control devices. Average speed controls.	Specific areas for safety reasons. Specific risk sections such as tunnels or viaducts.					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. Madrid, San Sebastián, Vitoria, Lleida, León …)	Multi-lane cinemometers, educational radars, software applications, En4sys	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Gijón, Ciudad Real, Sant Boi de Llobregat, Arganda del Rey, …)	Fixed cinemometers and mobile radars	Urban road network					

1.3.4.2 Red light control

Table 33: General progress on Red Light Control. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, DT	Camera, traffic and weather sensors and traffic light units	Interurban network with frequent adverse weather conditions					
Big cities (e.g. Madrid, Valladolid, Sevilla, Vitoria, Lleida, León …)	Photo-red systems, OCR/LPR, software applications, En4sys	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Ciudad Real, Terrassa, Sant Boi de Llobregat, Arganda del Rey, …)	Photo-red systems, OCR/LPR, software applications, En4sys	Urban road network					

1.3.4.3 Access control

Table 34: General progress on Access control. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT	VMS and LPR	Zones set according to the pollution protocol - air quality protection. Restricted access in high occupancy areas. Traffic restrictions on certain roads.					
Big cities (e.g. Madrid, Barcelona, Málaga, Sevilla, Vitoria, San Sebastián, Ciudad Real, León …)	Photo-red systems, OCR, software applications, SACAP	Urban road network					
Some municipalities with more than 50,000 inhabitants (Albacete, Ciudad Real, Terrassa, Sant Boi de Llobregat, …)	OCR/LPR, Bollards with remote control	Urban road network					
Toll operators (e.g. motorways)	VMS y LPR	High-capacity network					

1.3.4.4 Digital Tachograph

Table 35: General progress on Digital Tachograph. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGTT (Dirección General de Transporte Terrestre), DT	Digital tachograph	All vehicles weighing more than 3.5 tons or capable of carrying 9 or more persons (including the driver and subject to certain exceptions) and which are registered for the first time					

1.3.4.5 Video surveillance system in public transport

Table 36: General progress on the Video surveillance system in public transport. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. Madrid, Vitoria, San Sebastián, …)	On-board video surveillance cameras in the vehicles themselves, control centres, operation support systems	Urban and regional interurban public transport					
Some boroughs with more than 50,000 inhabitants (p.ej. Albacete)	On-board video surveillance cameras in the vehicles	Urban public transport					

1.3.5 Telematic payment and Electronic Toll Collection (ETC)

1.3.5.1 EFC (Electronic Fee Collection) and road pricing

Table 37: General progress on EFC and road pricing. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGTT, National Delegation of Toll Roads, SEITT	LPR/OCR, EETS (European Electronic Toll Service)	All Spanish toll roads					
Toll operators (e.g. motorways)	LPR/OCR, EETS	High-capacity network					

1.3.5.2 ETC Compliance

Table 38: General progress on ETC Compliance. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Toll operators (e.g. motorways)	DSRC antennas in tolls, EETS, on-board devices, CCTVs, LPRs	All Spanish toll roads					

1.3.5.3 ETC Infringements

Table 39: General progress on ETC Infringements. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGTT	Camera, Infringement	All Spanish toll roads					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Toll operators (e.g. motorways)	Sensor, ETC, DVIT and Automatic Infringement Device Integration with the National Centre for the Management of Fines (ESTRADA Centre)						

1.3.5.4 Mobile phone payment and card verification on public transport

Table 40: General progress on Mobile phone payment and card verification in public transport. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. Madrid, San Sebastián, …)	EMV contactless bank card payment, mobile APPs, credit card payment	Urban and regional interurban public transport					
Toll operators (e.g. motorways)	AWAI	High-capacity network					
Renfe Services	Mobile APP	Railway and multimodal transport network of other public and private transport modes					

1.3.5.5 ETC Application

Table 41: General progress on the ETC Application. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Toll operators (e.g. motorways)	EETS	All Spanish toll roads					

1.3.5.6 Shadow toll

Table 42: General progress on the Shadow Toll. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Toll operators (e.g. motorways), National Delegation of Toll Roads, SEITT, DGC	Gantry equipment, CCTVs, LPRs	All Spanish shadow toll roads					

1.3.6 Freight and fleet

1.3.6.1 Information and reservation services on safe and secure truck parking places

Table 43: General progress on Information and reservation services on safe and secure truck parking places. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Repsol Security Parkings, Logistics Areas, verified service areas, etc., DGC	Web and telephone reservation service	Parking lots defined in the National Platform for Safe and Secure Parking					
Toll operators (e.g. motorways)	VMS, Web and telephone reservation service	AP-7 Truck Park Montseny – Porta Barcelona					

1.3.6.2 Dangerous Goods Traffic Management

Table 44: General progress on Dangerous Goods Traffic Management. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT, SCT, DT	VMS, LPRs, Web servers	Interurban road network					
Big cities (e.g. Madrid, Barcelona, …)	VMS, LPRs, Web servers (subject to permissions and payment of fees)	Urban and interurban road network					

1.3.6.3 Dangerous Goods Monitoring

Table 45: General progress on Dangerous Goods Monitoring. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGTT	VMS, Web servers	All tunnels in the national road network					

1.3.6.4 Special Transport Management

Table 46: General progress on Special Transport Management. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT	Web application "TRAZA" for abnormal size/weight transport authorizations	The entire road network competence of DGT					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
SCT	Web application "TRESA" for abnormal size/weight transport authorizations	The entire road network competence of SCT					
DT	Complementary Traffic Authorization Application (ACC)	The entire road network competence of DT					
Big cities (e.g. Madrid, Sevilla, …)	VMS, LPRs, Web servers (Subject to permissions and payment of fees)	Urban road network					
Toll operators (e.g. motorways)	GETE	High-capacity network					

1.3.6.5 Urban and interurban logistics

Table 47: General progress on Urban and interurban logistics. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGTT	Technical Department	National road network					
Big cities (e.g. San Sebastián, Sevilla, …)	City Changer Cargo Bike Project. DUM public/private	Urban road network					

1.3.6.6 Lean and Green logistics

Table 48: General progress on Lean and Green logistics. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGTT	Creation of a logistics platform	National road network					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. Madrid, San Sebastián, Sevilla, …)	Sustainable Mobility Ordinance	Urban road network					

1.3.7 Transport facilities

1.3.7.1 ITS deployment and demand studies (ITS Electronic Product Supply Catalogue, ITS Action Plan)

Table 49: General progress on ITS Deployment and demand studies. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT	ITS Plan	The entire interurban road network					
Big cities (e.g. Madrid)	Urbanisation and planning projects	The entire road network					

1.3.7.2 Exploitation Support Systems (ESS)

Table 50: General progress on Exploitation Support Systems (ESS). Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	
Big cities (e.g. Madrid, Vitoria, San Sebastián, Sevilla, León, …)	Monitoring and control of the fleet by means of geolocation (GPS) and wireless voice/data communication with mobile units. Control of boarding systems. Controller help interface. Operations control centre: communication and database servers, customer positions, geographic and synoptic information.	Urban and interurban public transport					

WHO	HOW	WHERE	2011	2014	2017	2020	
Some municipalities with more than 50,000 inhabitants (e.g. Albacete, El Ejido, Terrassa, …)	Web servers, GPS tracking and fleet control and wireless voice/data communication with mobile units. Stop prediction system	Urban public transport					
Integrators, installers, and maintainers (e.g. INDRA)	Proyecto HARMONY	Bus fleets in the North of Madrid					

1.3.7.3 Travel planning (including door-to-door planner)

Table 51: General progress on Travel planning (including door-to-door planner). Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGTT	SITRANBUS Site	National interurban public transport					
DGT and other service providers (based on DGT sources)	Nationwide travel planning (including weather, incidents, restrictions and traffic LOS) through mobile APPs	The entire road network					
Big cities (e.g. Madrid, San Sebastián, Sevilla, León, …)	Web service and Mobile APPs	Urban and interurban public transport					
Some boroughs with more than 50,000 inhabitants (e.g. Albacete, El Ejido, Terrassa, …)	Mobile APP, Web portal, Integration of service information into Google Transit	Urban public transport					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Integrators, installers and maintainers (e.g. INDRA)	Mobile, APP or Web Site	Carried out within R&D projects in the Shift2Rail-IP4 program: Attracktive, Co-Active, Connective, Cohesive, MaaSive, of which Indra is a partner. Complemented by the Open Call Shift2MaaS project, with which Indra collaborates, in which the developments will be tested in real environments					
Toll operators (e.g. motorways)	Mobile APP or Web Site	High-capacity network					
Renfe Services	APP and mobility platform	The RaaS project includes an intermodal planner with national coverage. In pilot phase urban areas of Madrid and Barcelona and HS train between both					

1.3.7.4 Intermodal transport management

Table 52:Progress in Intermodal transport management. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT	Dissemination of long-range road trip information throughout the country to access ports (traffic levels, port occupancy, estimated departure times, rest areas en route, etc.)	Seasonal Road-Sea Intermodality					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. Madrid, León, …)	Introduction of a single transportation card. Systems for harmonising electronic tickets from different operators. Control and clearing centre for distribution among operators. APPs to manage and monitor intermodal transport (SGRAF, GEIS, SGIP Intermodal, etc.)	Urban and interurban public transport					
Some boroughs with more than 50,000 inhabitants (El Ejido)	Integration of Urban Transport in the Almeria Metropolitan Transport Consortium.	Urban public transport					
Integrators, installers and maintainers (e.g. INDRA)	Mobile APP or Web Site	Carried out within R&D projects in the Shift2Rail-IP4 program: Attracktive, Co-Active, Connective, Cohesive, MaaSive, of which Indra is a partner. Complemented by the Open Call Shift2MaaS project, with which Indra collaborates, in which the developments will be tested in real environments					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Renfe Services	APP and mobility platform	The RaaS project includes an intermodal planner with national coverage. In the pilot phase, urban areas of Madrid and Barcelona and the HS train between the two.					

1.3.7.5 E-ticketing

Table 53: General progress on E-ticketing. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGTT	SIRDE	National interurban public transport					
Big cities (e.g. Madrid, San Sebastián, León, …)	Contactless technology. Sales system. Card use control system, control centre and electronic ticket management. Payment with QR codes (e.g. E-MOBASK)	Urban and regional interurban public transport					
Some boroughs with more than 50,000 inhabitants (e.g. El Ejido, Molina de Segura, Terrassa, …)	Cards with contactless technology	Urban public transport					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Integrators, installers and maintainers (e.g. INDRA)	Mobile, APP or Web Site	Carried out within R&D projects in the Shift2Rail-IP4 program: Attracktive, Co-Active, Connective, Cohesive, MaaSive, of which Indra is a partner. Complemented by the Open Call Shift2MaaS project, with which Indra collaborates, in which the developments will be tested in real environments					
Renfe Services	APP and mobility platform	The RaaS project includes E-tickets for various modes of transport.					

1.3.7.6 Transfers

Table 54: General progress on Transfers. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. San Sebastián, Vitoria, León, …)	Line and zone defined Transfers, APPs and multimodal information servers and contactless card to allow free transfers within a given time	Urban public transport					
Some boroughs with more than 50,000 inhabitants (e.g. Ciudad Real, Albacete, El Ejido, Molina de Segura, Terrassa, …)	Transfers defined by lines and zones. and contactless card to allow free transfers within a given time	Urban public transport					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Integrators, installers and maintainers (e.g. INDRA)	Mobile, APP or Web Site	Carried out within R&D projects in the Shift2Rail-IP4 program: Attracktive, Co-Active, Connective, Cohesive, MaaSive, of which Indra is a partner. Complemented by the Open Call Shift2MaaS project, with which Indra collaborates, in which the developments will be tested in real environments					
Renfe Services	APP and mobility platform	The RaaS project includes an intermodal planner with national coverage.					

1.3.7.7 Integration of data and information in a single architecture

Table 55: General progress on the Integration of data and Information in a single architecture. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
DGT	INTERCENTROS and DATEX II	The entire road network					
Big cities (e.g. Madrid)	Real-time consolidated databases, Open Data Portal, Web portal for developers based on Open Source software technologies and Open Standards	The entire road network					
Some boroughs with more than 50,000 inhabitants (e.g. El Ejido, Molina de Segura, Terrassa, …)	Web servers and data export in international standard format	Urban public transport					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Integrators, installers and maintainers (e.g. INDRA)	Mobile, APP or Web Site	Carried out within R&D projects in the Shift2Rail-IP4 program: Attracktive, Co-Active, Connective, Cohesive, MaaSive, of which Indra is a partner. Complemented by the Open Call Shift2MaaS project, with which Indra collaborates, in which the developments will be tested in real environments					
Renfe Services	APP and mobility platform	The RaaS project integrates intermodal information with national coverage.					

1.3.7.8 Traveller information

Table 56: General progress on Traveller information. Source: Own Elaboration

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Big cities (e.g. Madrid, Sevilla, San Sebastián, Vitoria, León, …)	System for visually impaired people inside the bus. Wireless communication between the control centre (ESS) and the information screens in real time. Applications and websites for the dissemination of information to users	Urban and regional interurban public transport					

WHO	HOW	WHERE	2011	2014	2017	2020	2023
Some boroughs with more than 50,000 inhabitants (e.g. Ciudad Real, Albacete, El Ejido, Molina de Segura, Terrassa, …)	ESS, Web server, mobile APPs, etc	Urban public transport					
Toll operators (e.g. motorways)	Mobile, APP or Web Site	High-capacity network					
Integrators, installers and maintainers (e.g. INDRA)	Mobile, APP or Web Site	Carried out within R&D projects in the Shift2Rail-IP4 program: Attracktive, Co-Active, Connective, Cohesive, MaaSive, of which Indra is a partner. Complemented by the Open Call Shift2MaaS project, with which Indra collaborates, in which the developments will be tested in real environments					
Renfe Services	APP and mobility platform	The RaaS project includes an intermodal planner with national coverage. In the pilot phase, urban areas of Madrid and Barcelona and the HS train between the two.					

Illustration 5. Variable Message Signs. Fuente: DGT Magazine

1.4 Contact information

1.4.1 Delegated Regulation (EU) 2017/1926 with regard to the provision of multimodal travel information services throughout the European Union (priority action a)

National Access Point contact details

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1.4.2 Delegated Regulation (EU) 2015/962 with regard to the provision of real-time traffic information services throughout the European Union (priority action b)

National Access Point contact details

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1.4.3 Delegated Regulation (EU) 886/2013 concerning data and procedures to provide, where possible, minimum universal traffic information relating to road safety, free of charge to the user (priority action c)

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1.4.4 Delegated Regulation (EU) 885/2013 with regard to the provision of information services on safe and secure parking areas for trucks and commercial vehicles (priority action e)

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2 Projects, activities and initiatives

In the following sections, the most significant initiatives and progress are described and classified in the various priority areas as shown in the image below.

Illustration 6. Projects, activities and initiatives. Source: Own Elaboration

Depending on the subject matter of the activities, they are classified in relation to the priority actions according to the priority areas and in compliance with Directive 2010/40/EU.

2.1 Priority Area I. Optimal use of road, traffic and travel data

The objective of the projects in this priority area is mainly focused on improving the provision of traffic and travel information services in order to provide more accurate and reliable pre-trip and on-trip traffic information that can be delivered to users' smartphones, navigation devices or on-board units in cars and trucks.

This information includes planned roadworks, sports events, estimated time of arrival and warnings about adverse weather or particular conditions along the route.

2.1.1 Description of national activities and projects

Optimal use of traffic, road and travel data has a great impact on ITS projects. These projects can be divided into three (3) different priority actions:

- Priority Action (a): Multi-modal Travel Information Services
- Priority Action (b): Real-time Traffic Information Services.
- Priority action (c): Universal Traffic Information in relation to Road Safety.

On the other hand, there are other activities and initiatives associated with these issues that do not fall within any of these priority actions.

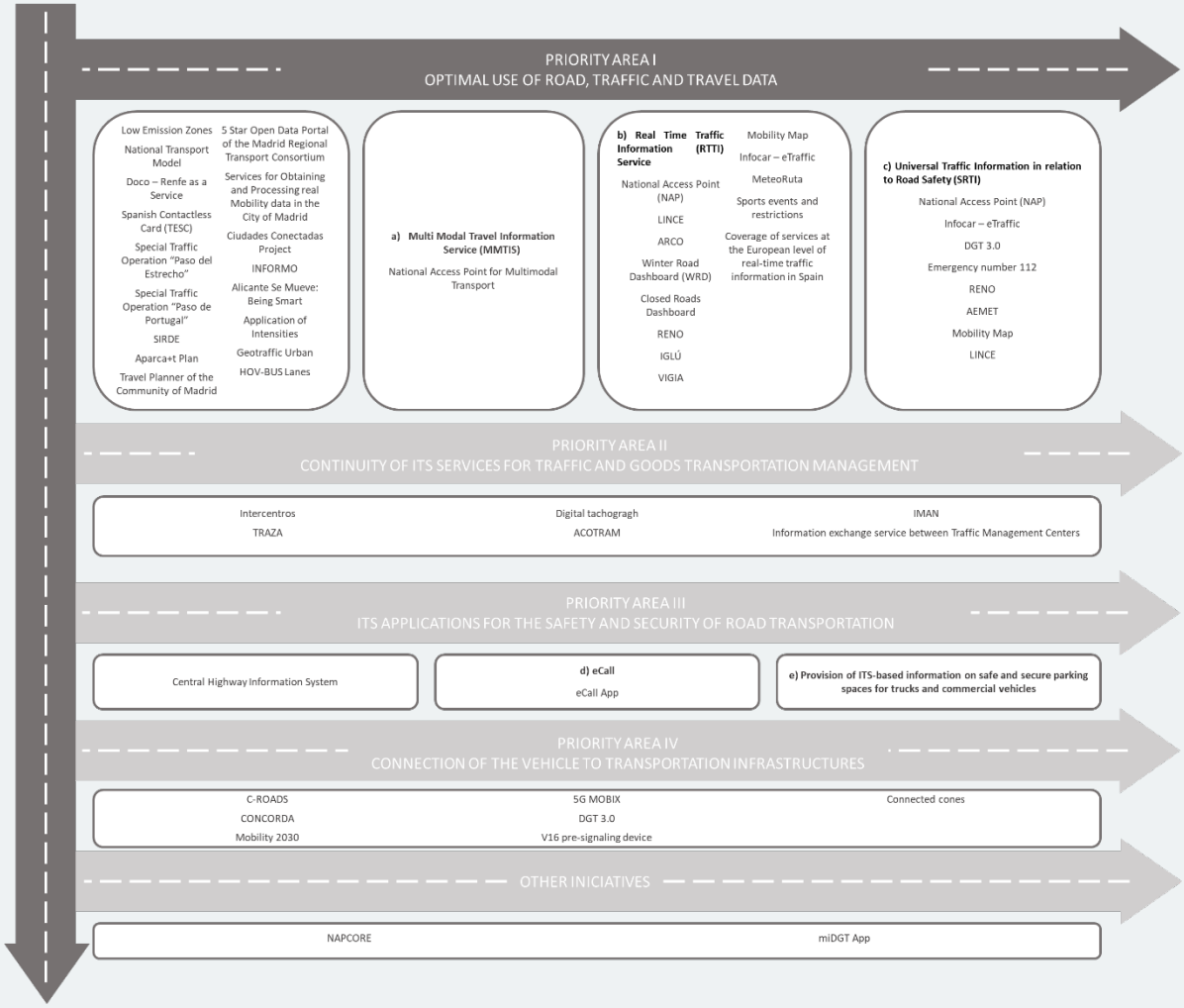


Illustration 7. Priority Area I. Projects, activities and initiatives. Source: Own Elaboration

2.1.2 Progress since 2020

2.1.2.1 Low Emission Zones

In accordance with the provisions of article 14.3 of the Law on Climate Change and Energy Transition, which includes the establishment of these zones, LEZ is understood to be the area delimited by a public Administration in which access, circulation and parking restrictions are applied. of vehicles to improve air quality and mitigate greenhouse gas emissions, in accordance with the classification of vehicles by their level of emissions in accordance with the provisions of the current General Vehicle Regulations.

In Spain, at the end of 2022, the Royal Decree regulating Low Emission Zones was approved, which establishes that Spanish municipalities with more than 50,000 inhabitants, island territories and municipalities with more than 20,000 inhabitants that exceed the limit values of regulated pollutants They must adopt Sustainable Urban Mobility Plans, SUMP, before 2023, that introduce mitigation measures that allow reducing emissions derived from mobility, including, among others, the establishment of low-emission zones. The Royal Decree defines specific and quantifiable objectives in the field of low-emission zones, which can be conveniently monitored and evaluated, and establishes the minimum requirements that these zones must meet in key aspects such as extension, delimitation or access conditions, providing

legal certainty to individuals and companies through homogeneous legislation throughout the national territory.

The Ministry for the Ecological Transition and the Demographic Challenge has prepared an interactive map of LEZ in Spain, based on its own sources and communications from the local entities themselves, which must inform the Ministry about the LEZ established in their territory, including, among other aspects, the delimitation and surface area of the LEZ, the measures adopted and its development schedule, in accordance with article 10.3 of the Royal Decree.

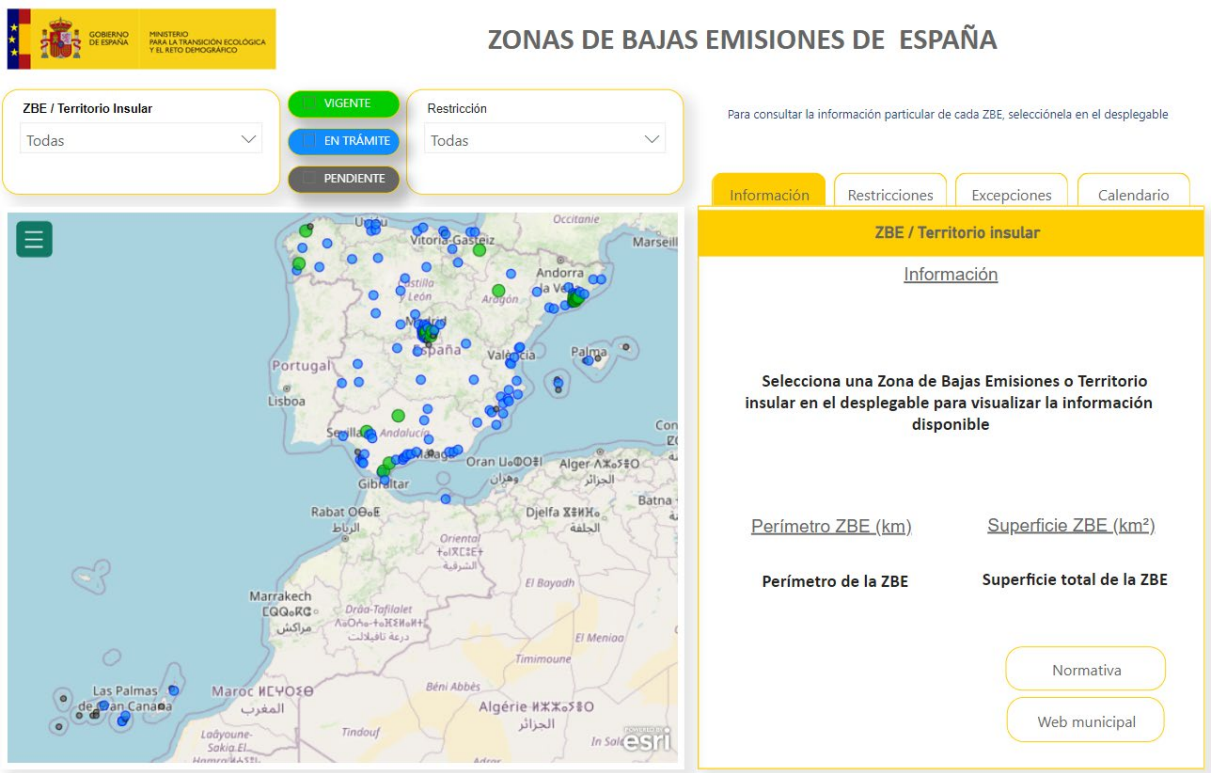


Illustration 8. Interactive map of LEZ in Spain: Source: Ministry for Ecological Transition and the Demographic Challenge.

The map shows all the obligated municipalities and island territories and contemplates three categories of LEZ depending on their level of implementation, distinguishing between current, pending or pending LEZ.

Within the current LEZ, the interactive map represents the extension and contour of the different implemented LEZ. In addition, each LEZ has an associated table that shows the general information, restrictions, exceptions and implementation schedule of the LEZ, with links to the reference regulations and official websites.

2.1.2.2 National Transport Model

In 2019, MITMA began the development of the National Transport Model (MNT), a planning tool at national level, through the assignment made to INECO. This tool is based on a model, for passengers and freight, which will allow the identification of bottlenecks and necessary connections, selection of actions, prospective traffic analysis and the collection of data necessary for cost-benefit analysis.

The MNT is conceived as a 4-stage model focused on interprovincial mobility, both for passengers and freight. The modelling takes 2017 as the base year for calibration. In the case of passengers, the following modes of transport which will be modelled are: private vehicle, rail, bus, sea and air. For freight, the transport modes modelled will be: road, rail, sea and air.

Illustration 9. Abstraction of the territorial system. Source: INECO

The aforementioned trend Origin-Destination matrices of travelers that the MNT provides us as output, consist of Origin-Destination matrices of trips and stages at the interprovincial level and with third countries, modeling transport by private vehicle, bus, rail, maritime and aerial. Both total and disaggregated data are presented, distinguishing between the different modes of transport, population groups and travel reasons considered by the MNT. The matrices corresponding to the years 2017, 2030 and 2050 are included.

For the calibration and validation of the MNT in the passenger part, it has been necessary to previously obtain synthetic Origin-Destination matrices for the base year of the Model (2017), which have been constructed fundamentally from the data provided by the “Study of analysis of mobility through Big Data technology” carried out by MITMA in 2018, with the consequent adaptations to the needs of the MNT and hypotheses regarding stratification of demand and mode of transport, complemented with data from other official sources, both national as international.

The aforementioned trend Origin-Destination matrices of merchandise that the MNT provides us as output, consist of Origin-Destination matrices of trips and stages at an interprovincial level and with third countries, also distinguishing the main national port areas and modeling road, rail, sea and air transport. Both total and disaggregated data are presented, distinguishing between the different modes of transport and categories of merchandise considered by the MNT. The matrices corresponding to the years 2017, 2030 and 2050 are included.

For the calibration and validation of the MNT in the merchandise part, it has been necessary to previously obtain synthetic Origin-Destination matrices for the base year of the Model (2017), which have been constructed from the different official data sources available, both at a national and international level, with the consequent adaptations to the needs of the MNT and hypotheses regarding the classification of goods and mode of transport.

2.1.2.3 dōcō - Renfe as a Service

The dōcō project, formerly known as RaaS (Renfe as a Service), is an initiative that has been developed in recent years with the aim of making short, medium, long distance and last mile trips easier. All this, through the combination of multiple transports to be able to offer all people

the opportunity to choose their mobility preferences, whenever they require it, according to their specific needs in the same place.

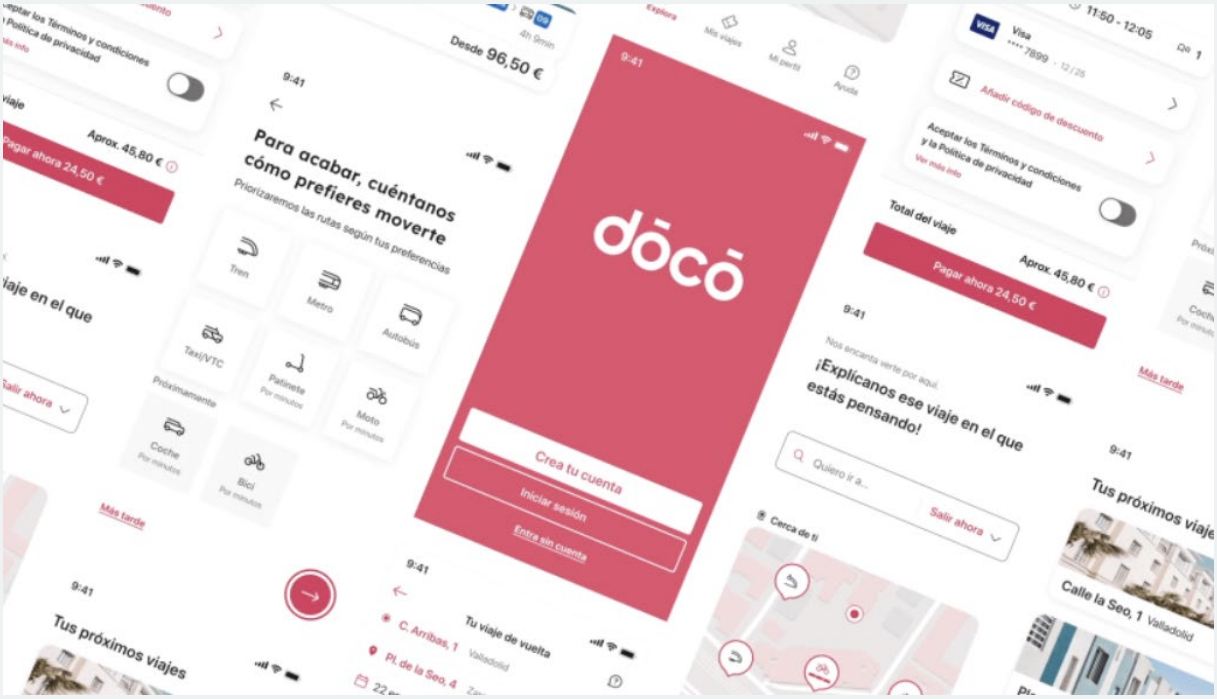


Illustration 10. dōcō application environment. Source: Renfe Blog

It allows, in a single APP, to plan the journey, reserve means of transport, acquire transport tickets, make payment, and access services. In addition, it provides information to the traveler and has a customer service interface.

2.1.2.4 Spanish Contactless Card

The Spanish Contactless Card Project constitutes a tool for Interoperability in Mobility and especially in Public Transport. The term 'card' refers to the physical medium, although it does not have to be a card itself. The communication standard is shared between several devices, such as mobile phones, smart watches, wearables (devices capable of supporting application computing) and of course cards and terminals. In particular, for payment with a mobile phone there are several alternatives via App (computer application), using NFC (Near Field Communication), by generating a QR code (Quick Response code), with an EMV card or with developed computer applications. to the letter.

Numerous studies and committees have been developed to define specifications and pilot projects to compare the results. What was initially proposed as an interoperable contactless card ended up being configured as a Secure Code for Interoperability in Transportation that is introduced into the different existing contactless cards and can even be used under other supports such as QR codes.

This is an economic compensation system managed by a Coordinating Entity that will be responsible for establishing economic and technological agreements with transport operators. With said Coordinating Entity, other Coordinating Entities that can help complement the network may collaborate. Likewise, the Coordinating Entities must manage the relationship with the “card holder” entities or supports on which to adapt the technology that facilitates access for their clients to the transport network associated with the network.

The System corresponds to modern account-based payment approaches (ABP-Account Based Payments). It also allows the establishment of virtual prepaid wallets and titles through locators that also allow the necessary anonymity of some users in addition to constituting one of the best solutions for the single ticket. Payment processing can be online and offline, specifically ODA (Offline Data Authentication) can be incorporated if there are no communications, priority is given to accepting passengers quickly, purchases are of low value or the application of variable rates.

This system is also being considered as the basis of interoperability that facilitates the deployment of Mobility as a Service (MaaS-Mobility as a Service) services in Spain. Thus, in addition to facilitating interoperability between different Public Transport networks, access to it can be facilitated from other types of operators: Car Sharing, public bicycle, Parking, taxi, tolls, etc.

2.1.2.5 "Paso del Estrecho" Special Traffic Operation

The General Directorate for Traffic (DGT) provides information and assistance to users on their trips through the main routes in Spain to the ports of departure to North Africa. This operation involves more than 760.000 vehicles crossing the border between France and Spain (Irún and La Jonquera) and using these corridors to reach their destination.

This special traffic operation comprises rest areas, information points, emergency areas and variable signposts located in the two main national corridors: the Central Corridor and the Mediterranean Corridor.

Illustration 11. Interactive map of Operation Strait Crossing. Source: DGT

The traffic information and management system are based on the monitoring of the main borders of Spain with France through Variable Signposts which provide, among other things, information on the occupancy rate and waiting times from the ports of departure. In addition, the system has more than fifty (50) LPRs and other means at the main boarding ports to North Africa, which provide updated information on movements and a prognosis of the entry of traffic to the ports. Additionally, the system provides recommendations on the purchase of boarding tickets.

In emergency situations, the panels are also used to give warnings and recommendations to the users.

In order to know precisely the number of vehicles crossing the borders of Irún and La Jonquera, the system has a Borderline Information System (SIF - Sistema de Información de Frontera) for the integration of as much data as necessary to calculate the estimated mass movement.

This system allows reading and identifying the place of origin of the vehicles at the border crossings, automatically obtaining the vehicle capacity. The data provided by the SIF is collected by the hour and can be used to obtain time evolution at the borders.

In recent years, the General Directorate of Traffic has improved the quality of its equipment, thus having state-of-the-art devices to offer maximum quality information to its users.

For the 2023 edition, a new tool was prepared that complements the Border Information System (SIF-OPE) with the objective of minimizing the number of emails and facilitating access to the information generated by the SIF, so that the information is accessible to the staff of the General Directorate of Traffic without the obligation to receive it by email in such an intensive manner.

A web application has been developed from which DGT personnel can consult the situation in which the OPE is, offering information of the last hour on the intensities of OPE vehicles, the prediction of arrival at the Port of Algeciras and distribution of license plates by the main corridors and sections of the peninsula and also download the reports of interest generated by the SIF according to the criteria of each user.

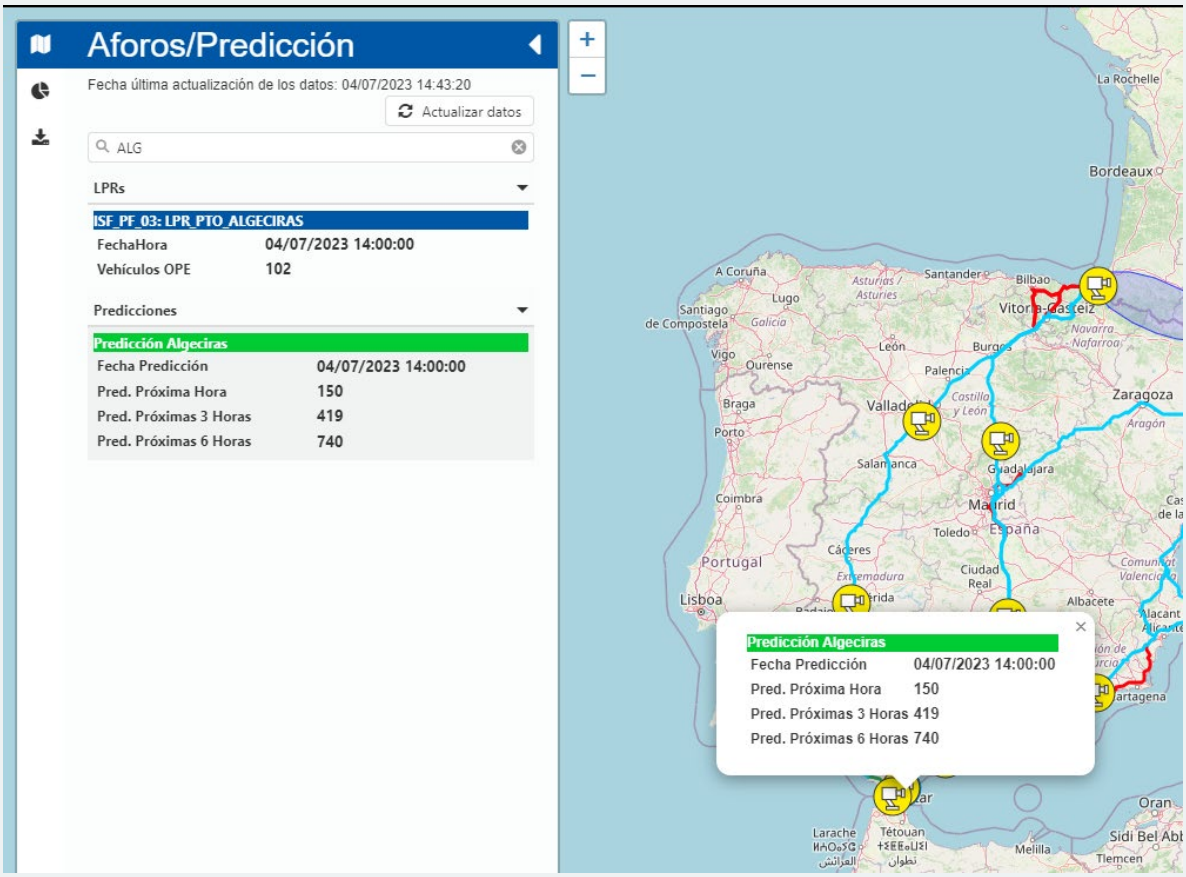


Illustration 12. Capacity prediction in the web application. Source: DGT

2.1.2.6 *"Paso de Portugal" Special Traffic Operation*

The General Directorate of Traffic provides information on routes originating at the border points of entry to Spain from France and destination at the border points of exit from Spain to Portugal; as well as the main itineraries followed through Spain.

This operation aims to control the number of vehicles carried out by France - Spain - Portugal in a maximum period of 48 hours during the months of July and August. It implies that every summer around 250,000 vehicles make the France - Portugal route through Spain.

In parallel, the total volume of vehicles entering Spain through the French border points and those leaving Spain through the Portuguese border points is controlled.

The analysis of this data allows the DGT to coordinate with the Portuguese Government on traffic and road safety matters.

Illustration 13. Map published on the DGT (OPP) website. Source: DGT

The main routes identified are as follows:

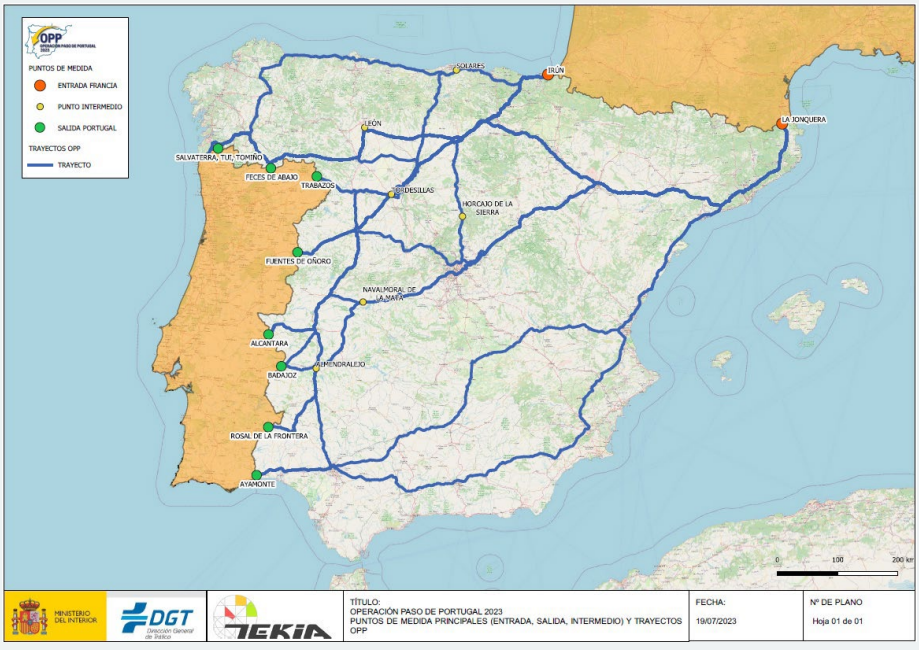
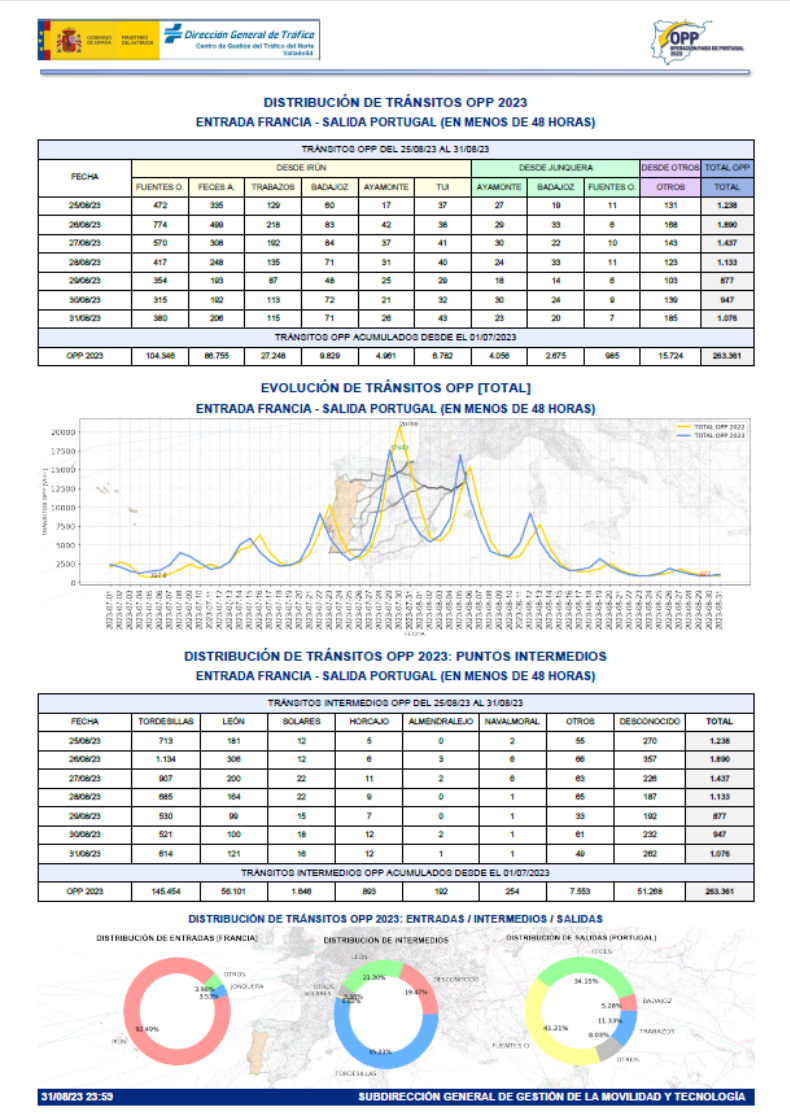


Illustration 14. Main itineraries and information point of the Portugal Passage Operation. Source: DGT

Information messages are displayed on the variable message panels, which are also used in emergency situations to provide warnings and recommendations to the public.

Illustration 15. Example of messages established during Operation Portuguese Passage. Source: DGT

A transit report and a nationality report are prepared and distributed daily:



Dirección General de Tráfico

DISTRIBUCIÓN DE TRÁNSITOS OPP 2023
ENTRADA FRANCIA - SALIDA PORTUGAL (EN MENOS DE 48 HORAS)

TRÁNSITOS OPP DEL 25/08/23 AL 31/08/23											
FECHA	DESDE IRÚN						DESDE JUNQUERA			DESDE OTROS	TOTAL OPP
	FUENTES O.	FECES A.	TRABAZOS	BADAJOZ	AYAMONTE	TUI	AYAMONTE	BADAJOZ	FUENTES O.	OTROS	TOTAL
25/08/23	472	335	129	60	17	37	27	19	11	131	1.238
26/08/23	774	499	218	83	42	38	29	33	6	168	1.890
27/08/23	570	308	192	84	37	41	30	22	10	143	1.437
28/08/23	417	248	135	71	31	40	24	33	11	123	1.133
29/08/23	354	193	87	48	25	29	18	14	6	103	877
30/08/23	315	192	113	72	21	32	30	24	9	139	947
31/08/23	380	206	115	71	26	43	23	20	7	185	1.076
TRÁNSITOS OPP ACUMULADOS DESDE EL 01/07/2023											
OPP 2023	104.346	86.755	27.248	9.829	4.961	6.782	4.056	2.675	985	15.724	263.361

EVOLUCIÓN DE TRÁNSITOS OPP [TOTAL]
ENTRADA FRANCIA - SALIDA PORTUGAL (EN MENOS DE 48 HORAS)

DISTRIBUCIÓN DE TRÁNSITOS OPP 2023: PUNTOS INTERMEDIOS
ENTRADA FRANCIA - SALIDA PORTUGAL (EN MENOS DE 48 HORAS)

TRÁNSITOS INTERMEDIOS OPP DEL 25/08/23 AL 31/08/23									
FECHA	TORDESILLAS	LEÓN	SOLARES	HORCAJO	ALMENDRALEJO	NAVALMORAL	OTROS	DESCONOCIDO	TOTAL
25/08/23	713	181	12	5	0	2	55	270	1.238
26/08/23	1.134	306	12	6	3	6	66	357	1.890
27/08/23	907	200	22	11	2	6	63	226	1.437
28/08/23	685	164	22	9	0	1	65	187	1.133
29/08/23	530	99	15	7	0	1	33	192	877
30/08/23	521	100	18	12	2	1	61	232	947
31/08/23	614	121	16	12	1	1	49	262	1.076
TRÁNSITOS INTERMEDIOS OPP ACUMULADOS DESDE EL 01/07/2023									
OPP 2023	145.454	56.101	1.646	893	192	254	7.553	51.268	263.361

DISTRIBUCIÓN DE TRÁNSITOS OPP 2023: ENTRADAS / INTERMEDIOS / SALIDAS

DISTRIBUCIÓN DE ENTRADAS (FRANCIA) — DISTRIBUCIÓN DE INTERMEDIOS — DISTRIBUCIÓN DE SALIDAS (PORTUGAL)

31/08/23 23:59 — SUBDIRECCIÓN GENERAL DE GESTIÓN DE LA MOVILIDAD Y TECNOLOGÍA

Illustration 16. Transit distribution report. Source: DGT

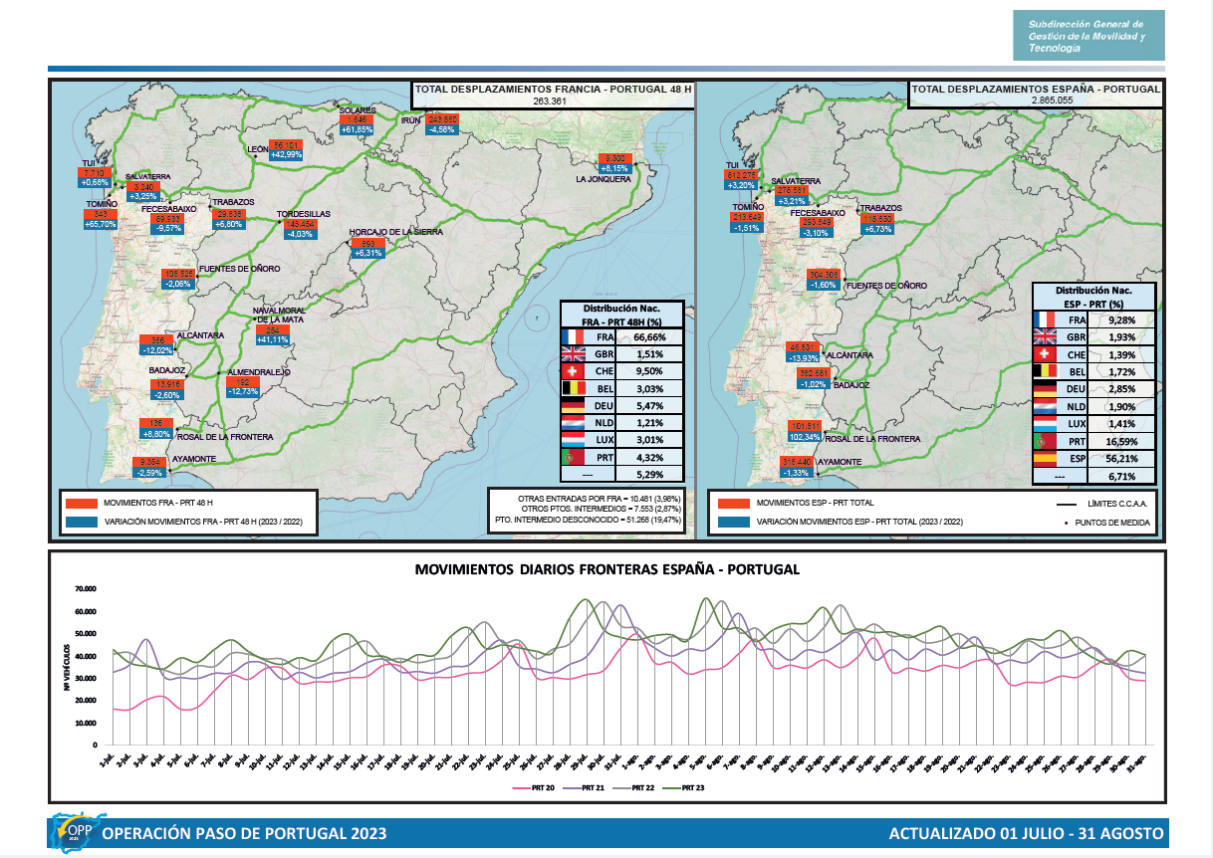


Illustration 17. Biweekly scorecard. Source: DGT

Finally, at the end of the summer, a document is produced in which all the data corresponding to the summer is collected, analyzed and exploited.

2.1.2.7 SIRDE

In 2016, the Ministry of Transport, Mobility and Urban Agenda developed an application called "SIRDE" (Sistema de Información de Registro de Datos de Explotación – Management Information System for Recording Data of Dispatches) to improve the management of road passenger transport concessions, which is the responsibility of the General State Administration.

This application can be downloaded free of charge from a device located on the buses themselves. SIRDE collects the operating data of the concessions by reading a QR code printed on the tickets. At the same time, the positioning of the buses is recorded. All the data and travel routes of the passengers are sent in real time to a data warehouse pertaining to the Ministry of Transport, Mobility and Urban Agenda, where they are managed and analysed for the development of O/D (Origin and Destination) matrices.

For the approval of this system, the Ministry carried out numerous tests on some travel routes, with the collaboration of various concessionary companies. Currently, more than a third of the concessions under the Ministry have SIRDE installed.

In order to facilitate the implementation of the Operating Data Recording Information System (SIRDE), a pre-production version has been made available at the Ministry's Information

Technology Sub-Directorate, which allows downloading the application and carrying out all the necessary tests before the mandatory date of use of the system.

2.1.2.8 Aparca + t Plan

This is a project to save money and reduce pollution. It consists of the creation of a network of park-and-ride lots (8 in total) in the vicinity of Cercanías stations and interchanges to encourage users to leave their private cars in favor of public transport. These parking lots are free of charge for those in possession of a transport ticket used during their stay, the duration of which must be between 5 and 16 hours on any day of the week. The app allows to validate the free stay, once the user has registered and entered his data such as license plate, transport card and means of payment.

In this way, modal interchange is boosted and the pressure of private traffic on the accesses to the capital is relieved. New parking lots will be added to the existing infrastructure in order to turn the whole into an intelligent, compact, easily identifiable network that benefits and prioritizes the use of public transport.

Illustration 18. Parking Aparca-T. Source: Community of Madrid

2.1.2.9 Travel planner of the Community of Madrid

The Community of Madrid is developing, together with the company INETUM, a multimodal itinerary planner that will be integrated into the web portals and apps for mobile phones and tablets of the Regional Transport Consortium.

The planner will allow the citizen to organize their route by public transport between any two points (origin and destination) in the entire region. The main tools that INETUM is developing are the calculation of multimodal public transport routes, the visualization of transport routes and their corresponding stops, with their approximate times of passage in real time, the publication of transport information, alert systems and incidents. of services, vehicle position, updating the cartography of transfers and walking routes for the adjustment of total travel times.

2.1.2.10 5 Stars Open Data Portal of the Regional Transport Consortium of Madrid

The CRTM 3 Star Open Data Portal provides an Open Data platform for developers, which guarantees a secure access point to the static and dynamic data of the public transport system of the Community of Madrid. Currently, work is being done to evaluate an architecture that allows reaching 5 stars on the Tim Berners-Lee scale on Open Data.

This portal mainly allows:

- Facilitate developer users from a single secure access point to consume planned and real-time public transportation system information, which is hosted and/or provided by the different current CRTM systems and tools.
- Show the different catalogs of static and dynamic data in a visual, descriptive and structured way, including methods to make online queries about different available web services and download data in non-proprietary structured formats. The Open Data Portal contains information on the public transport network of the Community of Madrid in GTFS format. This format has become a de facto standard for the publication of open transportation data and is divided into a static component containing schedule and transportation network information, and a real-time component containing transit times per stop. and service notices.
- Describe the steps to follow and offer documentation to obtain the different public data sets from external or third-party applications, ensuring up-to-date information on a secure and scalable environment.
- Have an appropriate management solution for the design and publication of APIs (API Management System) based on an Open API definition, in a controlled and secure manner, so that the information can be consumed from different channels by establishing availability and monitoring policies. traffic and consumption of services.
- Implement a solution based on Open Source and Open Standards software technologies, with the double objective of being aligned with the philosophy and culture of the Open Data concept, on the one hand, where accessible, reusable data is provided without technological restrictions to promote openness, and on the other hand, the participation and collaboration of the Community is encouraged as an engine of innovation and socioeconomic growth.
- Have a platform prepared for its future evolution towards a four- and five-stars Open Data model, which is also capable of integrating other external Open Data information services from other organizations linked to Public Transport in the Community of Madrid.

2.1.2.11 Services for Obtaining and Processing Real Mobility Data in the City of Madrid

This service allows us to know the real mobility that occurs in the city, as well as to carry out its subsequent treatment and preparation of reports and plans of the movements that are generated.

Obtaining traffic data is possible thanks to different devices and sources:

- Permanent capacity stations for vehicles, pedestrians and bicycles
- Portable flowmeters for specific measurements
- Catalog of open data from the municipal website such as parking, public transportation, even social networks

- Police reports
- Municipal-owned car parks (location, use)
- Parking on public roads (SER)
- Access to Madrid Central
- Uses of BICIMAD
- Loops in traffic lights
- Public Transport validation data
- Data provided by the DGT
- Data published by the INE (Statistics National Institute)
- Family budget survey
- Data published by the A.E.M.E.T.
- Data from air quality measurement stations of the Madrid City Council and other sources on pollution available in other areas of the Madrid City Council.

The tool under development will allow Madrid City Council to:

- Have a dynamic model for mobility management.
- Complement the mobility models of the Madrid City Council to have a comprehensive mobility model for private and public transport.
- Optimize processes and improve the quality of data obtained by devices deployed in the city.
- Accompany the General Directorate of Mobility Planning and Infrastructure, in the interpretation of mobility data.
- Reduce costs in the planning, management and operation of mobility.
- Have a fundamental tool in making mobility planning decisions with complete autonomy.
- Develop comprehensive open data platforms accessible to citizens that encourage their participation and involvement.
- Have the ability to respond to events in the city, a “smart city” dimension, and methods that reflect, systematize and support mobility decision-making.

2.1.2.12 Ciudades Conectadas Project

This project, promoted by the Valladolid City Council, has the main objective of creating a platform that includes specific applications for each city, operator and user. These will aim to make the transition and adaptation to the air quality and noise reduction measures imposed by the new local, state and European reality easier.

This project will be the national reference platform for the implementation, development and innovation of urban mobility in cities, serving as a governance tool for city councils and putting the security and simplification of the tool at the center of the project. for the citizen.

The fundamental goal is the development and implementation of a multi-city digital platform, in open source, for the collection, processing and exploitation of mobility data in an integrated and interoperable way. Thus, it will provide different urban mobility services, favoring the management of mobility in a coordinated manner, including monetary transfers with users.

The development of a single and common platform for the cities of Valladolid, Valencia, Vitoria, Logroño, Gijón and Fuenlabrada will be the birth of a new paradigm of collaboration and

sustainable development in which to advance solutions with a common standard, sharing expenses in development, comparing situations between similar cities, scalable and replicable in the rest of the cities that wish to join this network.

2.1.2.13 INFORMO

The Madrid City Council has the Informo system (informo.madrid.es), a citizen information system on a Web platform with a geographic system that integrates the following information in real time:

- Incidents: both planned and detected in real time by the Mobility Management Center operators through CCTV cameras or directly on the street by mobility agents or the police.
- Cameras: Location of the cameras of the closed television channel whose purpose is to monitor traffic. Clicking on each of them opens a small frame with an image from the camera in the last 5 minutes.
- Service levels: this is a magnitude that aims to broadly reflect the state of traffic in each segment of the road network. A color is associated with each value. Information is only shown in those segments that have magnetic induction loops or gauging chambers. This is information that is updated every 15 minutes.
- Traffic intensity: Number of vehicles per hour on the road segment. A color is associated with different ranges of values. Information is only shown in those segments that have magnetic induction loops or gauging chambers. This is information that is updated every 15 minutes.
- Red light control: Location of the devices that automatically detect violations for passing the stop line of a traffic light during the red phase. They are known as “photored”.
- Acoustic warning devices: Location of the sound devices that allow people with functional diversity related to their hearing abilities to know the beginning and end of the green phase of pedestrian traffic lights.

It incorporates the Low Emissions Zone of Special Protection (LEZSP) of the Central District and Plaza Elíptica as well as the Access to Madrid Central.

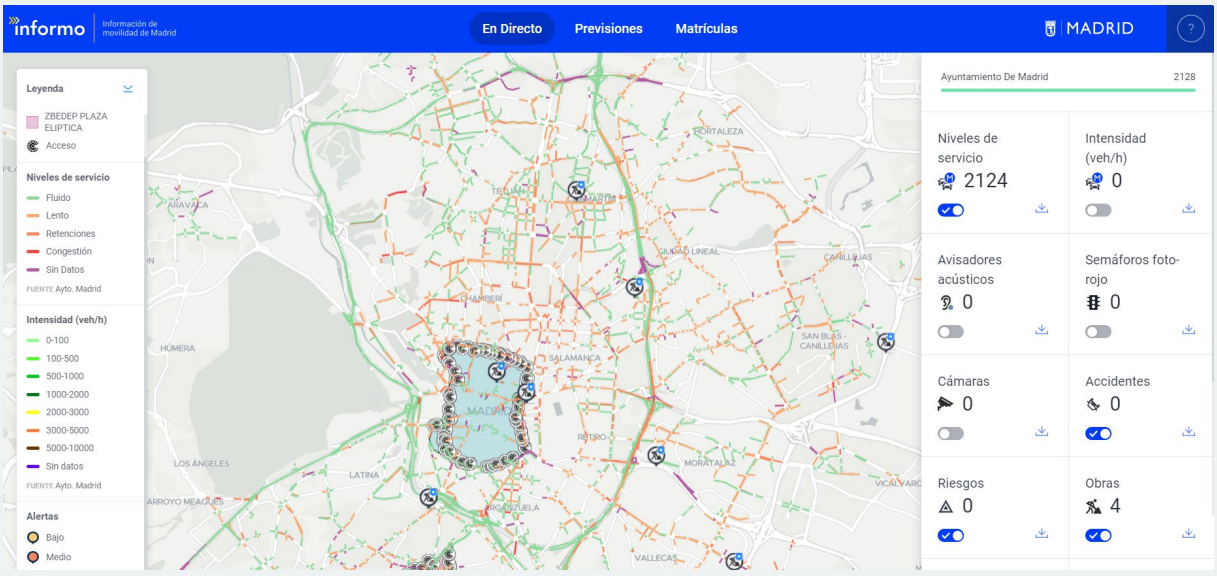


Illustration 19. INFORMO Madrid main interface. Source: INFORMO Madrid

2.1.2.14 Alicante Se Mueve: Being Smart

The main objective of the initiative "Alicante Se Mueve: Being Smart", by the Alicante city council, is to design and implement a global system in the city that will provide strategic information on all aspects related to mobility.

This platform will allow the extraction of sectorial indicators to be used by third parties and which will focus mainly on the achievement of direct benefits for the urban environment. It will also be a powerful tool for all the sectors that use it.

Illustration 20. Alicante Se Mueve Logo. Fuente: Alicante City Council

The actions to be carried out focus on the following components:

- Component 1: Traffic surveillance system (CCTV). This action consists of the implementation of a Traffic Management and Video Surveillance solution in the city of Alicante in order to optimize mobility management as a decisive factor for the well-being of the inhabitants and for the quality of the environment.
- Component 2: Video wall system. In order to improve the effectiveness of management and optimize the exploitation of the information coming from the different information collection systems, the scope of this component will consist of implementing a video wall system with 6 operator positions that allows receiving information from the solutions implemented in component 1 and component 3 and operate with them.
- Component 3: Analytical solution applied to the mobility environment. The main objective of this component consists of the implementation of a turnkey solution that allows an advanced and in-depth analysis of the data coming from the services of the city of Alicante, although within the scope of this project, said analyzes will be focused on the field of city mobility.
- Component 4: WEB Portal and mobile application. It contemplates the development and implementation of two new communication channels with citizens related to aspects of urban mobility within the municipality of Alicante. The purpose of these two new communication channels will be to provide information to improve the quality of trips made by citizens so that, in a simple and intuitive way, they can benefit from the new services provided by the implementation of the “Alicante moves” project. ”.
- Component 5: Application of equipment. This component must include the storage, processing and communications elements, both hardware and software, necessary for the start-up and operation of the solutions required in the different components of this Tender Document, in addition to those specific elements that have already been specified and requested. in their respective sections.
- Component 6: Civil works. This component includes the channeling and civil works that must be carried out in order to carry out the actions specified in component 1, as well as any other that requires some type of civil works.

At this time, we are in the process of executing this important and innovative municipal project, whose objective is to build a comprehensive urban mobility management solution, consolidating a scalable technological environment, which makes it possible to obtain and exploit mobility information in time. real, improving the information that citizens receive and providing this City Council with business intelligence and advanced analysis tools (descriptive, predictive and prescriptive), for making strategic decisions in the field of mobility. In 2021, the Alicante City Council installed a mesh of 156 license plate recognition and traffic regulation cameras to improve mobility.

2.1.2.15 Application of intensities

The General Directorate of Traffic has an application to help traffic management that becomes especially relevant during periods of Special Operations.

The developed system uses a web platform so that the user can access and make the necessary queries comfortably. Currently the system offers four basic types of queries: both in real time and historical:

- Consultation of equipment by sections: Allows you to choose a specific section (both directions) and display its data graphically.

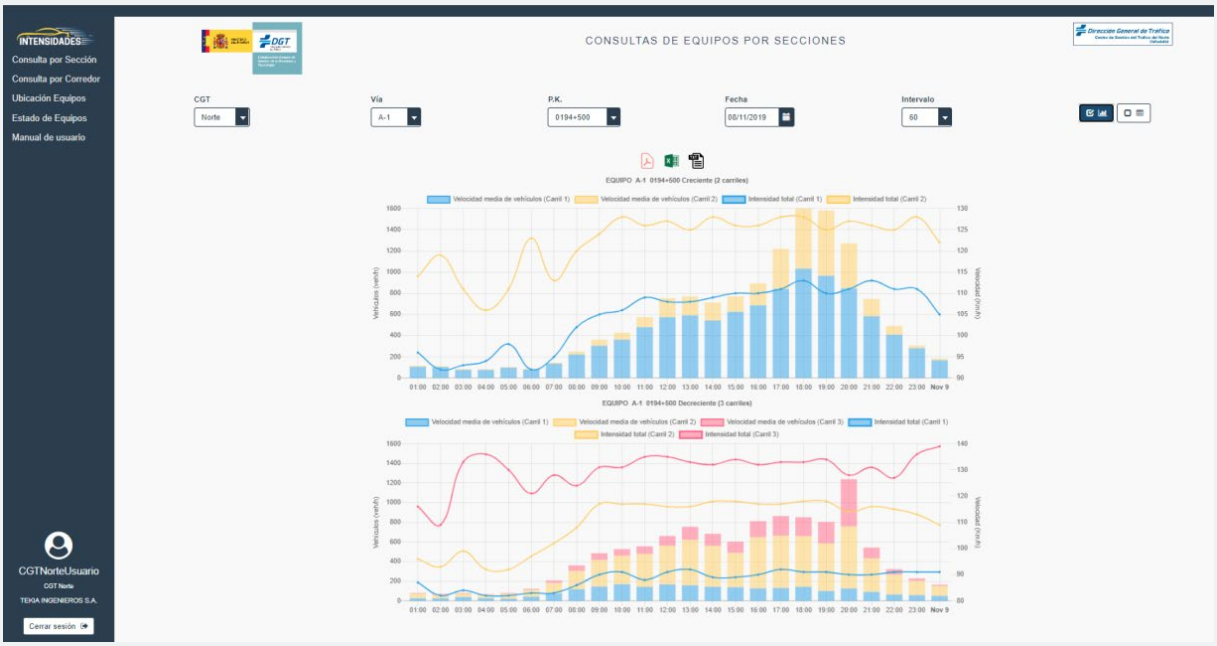


Illustration 21. Equipment consultation view by sections. Source: DGT

- Consultation of corridors or Hubs: Offers a visualization of the main teams that make up each corridor within the scope of the management center analyzed.

Illustration 22. Consultation view by brokers. Source: DGT

- Equipment Location: Shows the geographic location of equipment used in special operations data submissions.

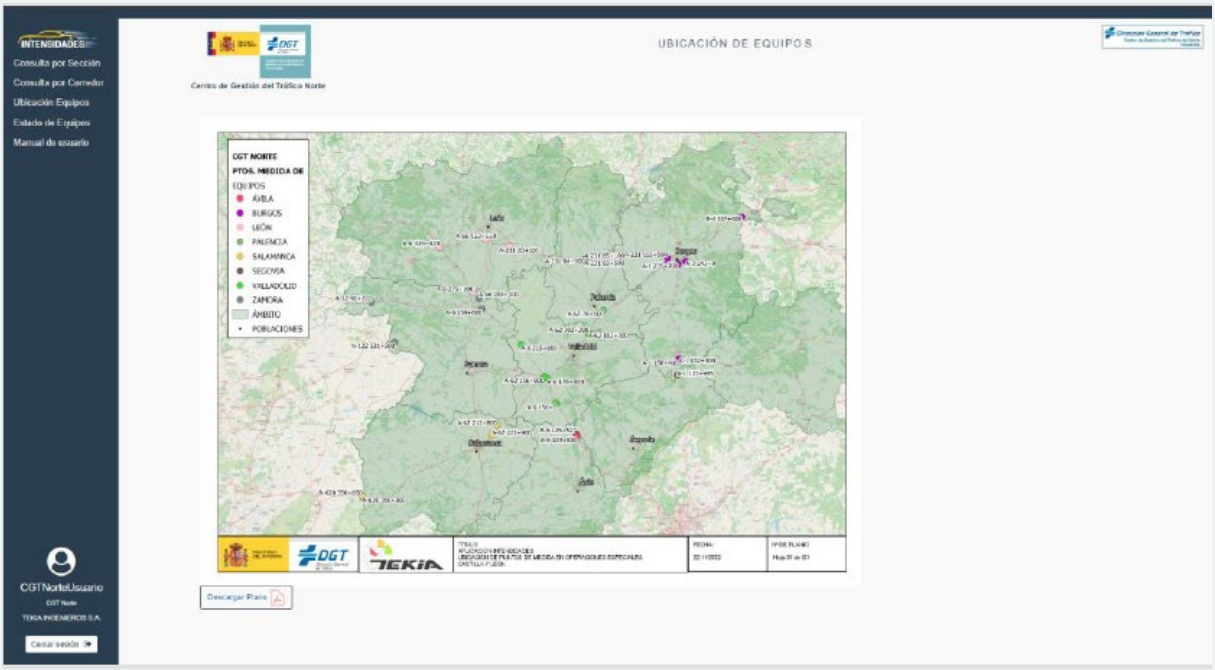


Illustration 23: View equipment location. Source: DGT

- Equipment status: Generates a report of the equipment included in each channel that allows determining if they are working correctly or if a communication failure has been detected.

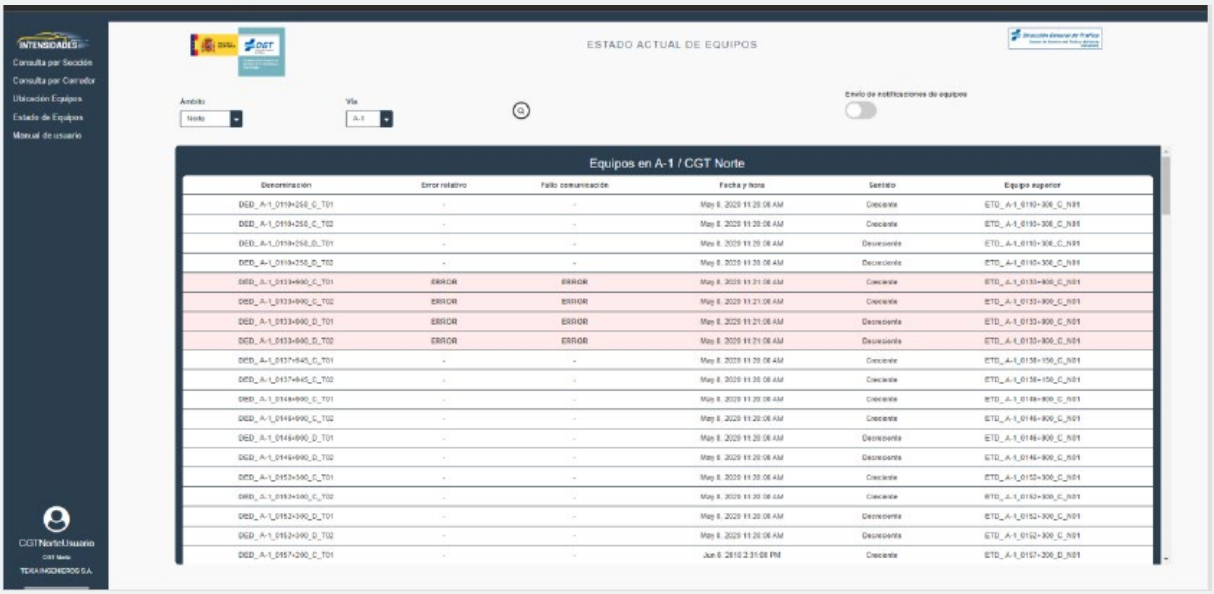


Illustration 24. View equipment status. Source: DGT

Through the application, sending of intensity data is scheduled for specific periods of time, Special Operations, in which traffic intensities are communicated by email on an hourly or daily basis and to predefined recipients.

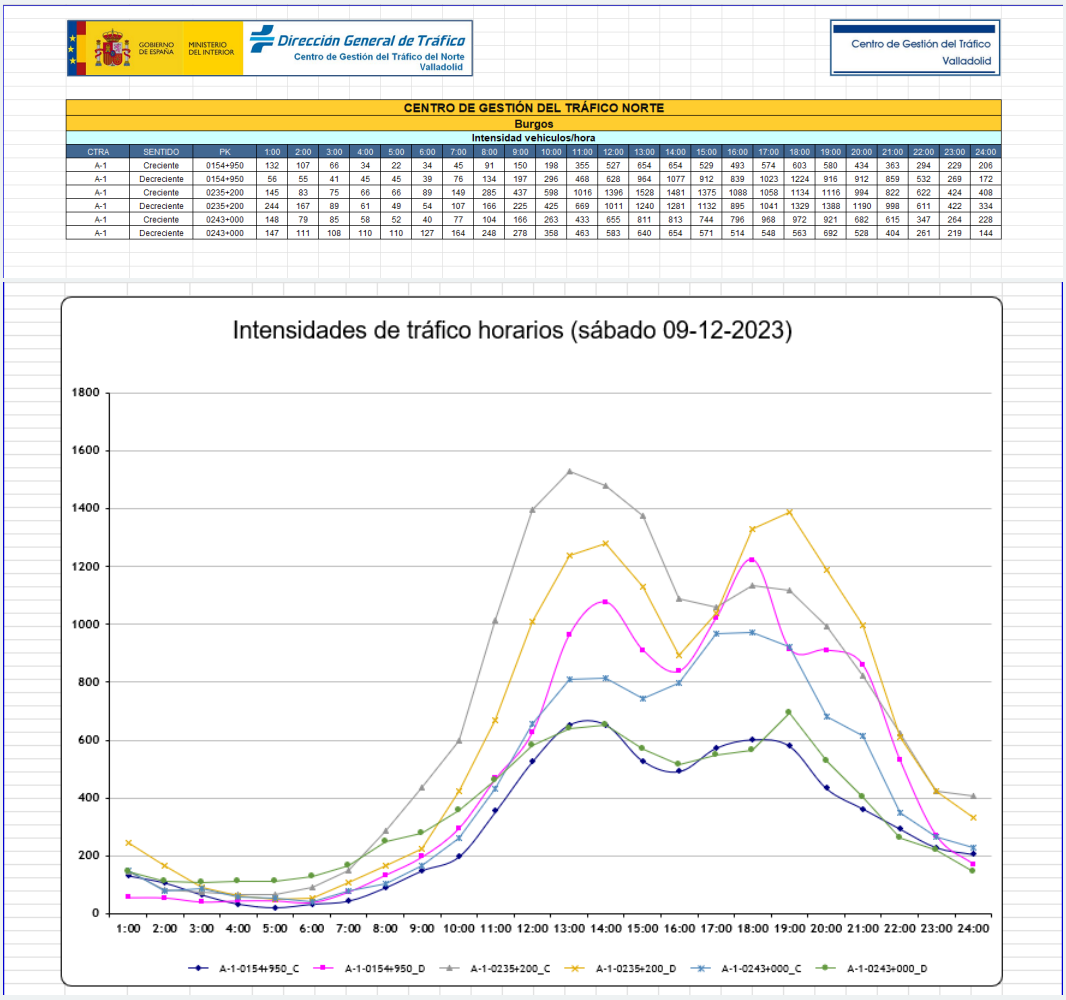


Illustration 25. Example of information sent by email. Source: DGT

2.1.2.16 Geotraffic Urban

GeoTraffic Urban allows these City Council users to know the speeds and travel times of each urban section, monitor defined sections or intersections. Specifically:

- Monitor urban mobility allows you to consult the traffic situation in real time.
- Carry out traffic and road safety studies displays information on historical speeds and travel times, for carrying out predictive analyzes and corrective measures, using TomTom's historical traffic information.
- Manage traffic reports: Once the analyzes are generated, they are stored as history, allowing the user to compare the data from the reports already generated.
- Preview reports: Allows you to compare reports in a window with 4 synchronized maps.

2.1.2.17 HOV-Bus Lanes

The aim of this type of lanes is to reduce traffic congestion at access points and exits from big cities. In fact, HOV-Bus lanes are usually physically separated from the rest of the lanes, with permanent barriers, and are usually reversible, in order to decongest traffic in the direction of the exit from the city, or at the access, as required.

Illustration 26: HOV-Bus lane in A-6 access. Source: DGT

As a general rule, and as is currently being implemented at national level, they will be able to run on one HOV-Bus lane:

- Vehicles with two or more occupants, including the driver.
- Two or three-wheeled motorcycles, cars, mixed vehicles (vans) and buses with more than 3.500 kg of MAM and articulated buses.
- These same vehicles only occupied by the driver when they carry the V-15 reduced mobility sign, are holders of a driving licence with some accredited physical limitation, two or three-wheel motorcycles, buses with more than 3.500 kg of MAM, vehicles with ZERO emissions label from the DGT, taxis and carsharing vehicles. The latter vehicles must carry the sign, which identifies them as car sharing, stuck on the upper left corner of the windshield.
- Vehicles with ECO, C and B labels when expressly indicated on the variable lane access signs. In this case they must be clearly identified by the sticker on the lower right-hand corner of the windshield or, if there is no sticker, in a visible place.
- Vehicles intended for public services such as police, fire brigade, civil protection, rescue teams, emergency health assistance and road maintenance employees.

Currently, the DGC has Bus-HOV lanes on the central lane of the A-6 highway (kms. 6 to 20), in Madrid, which also functions as a reversible lane; in the left lanes of both directions of the GR-3211 highway (kms. 0.115 to 1.410, in increasing direction and 0.105 to 1.530, decreasing direction), in Granada. However, in the case of Madrid, the Ministry of Transport and Sustainable Mobility is studying the possibility of implementing a new Bus-HOV lane on the A-

5 and has definitively approved the projects for the implementation of this system on the A-2 whose works are scheduled to begin at the beginning of 2024. The main characteristics of the Bus-HOV lane of the A-2, highlighting that it seeks to provide the highway with the necessary infrastructure to allow the exclusive use of the left lane for this purpose, through intelligent road management based on ITS systems.

To this end, a physical separation is not foreseen between the reserved lane and the rest of the lanes on the road, but rather a user information system is projected through variable light signage, supported by prior fixed horizontal and vertical signage, with the objective of indicating the state and situation of the reserved lane and its use with maximum coverage.

Along the line separating the center and left lanes, luminous beacons will also be placed embedded and flush with the pavement, which will indicate, in red, the sections in which it is not possible to access the reserved lane, and in green, the sections enabled for this.

Likewise, to alleviate possible disruptions to traffic caused by the implementation of the Bus-HOV lane, the projects include specific actions to improve the existing infrastructure.

Two Bus-HOV lanes of this same type are being planned on the Island of Tenerife (Canary Islands), Specifically on the TF-1 and TF-5 routes.

Finally, comment that the traffic management of these Bus-HOV lanes is carried out by the DGT in coordination with the DGC, Cabildo Insular de Tenerife and Government of the Canary Islands. And also note that the SCT (Servei Català de Trànsit) has a lane of these characteristics on the C-58 between Cerdanyola and Meridiana in Barcelona.

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

2.1.3.1 Progress made in terms of the accessibility and exchange of the travel and traffic data types

2.1.3.1.1 NATIONAL ACCESS POINT FOR MULTIMODAL TRANSPORT

In accordance with article 4.3.a of Delegated Regulation (EU) 2017/1926 on the provision of information services on multimodal travel, Spain, together with the Ministry of Transport and Sustainable Mobility, has begun the implementation of its National Access Point of Intermodal Transport. The National Access Point for Multimodal Transport is a web portal in which digitized information on the transport offer and mobility services for travelers throughout Spain will be concentrated. It will include all modes and means of transport: road, rail, sea, and air, both interurban and urban.

The National Access Point (NAP) is a service required by the European Commission for the provision of information services on multimodal travel in the European Union (EU) created by the Ministry of Transport and Sustainable Mobility. The Ministry collects transport data and subsequently makes it available to any interested party, promoting the creation of new applications, platforms and services for the user. In the future, the development of new applications aimed at mobility is planned, so there will be greater visibility of the transport service offering.

Illustration 27. National Multimodal Transportation Access Point Interface. Source: Ministry of Transport and Sustainable Mobility

Currently 86 bus data sets, 28 rail data sets, 3 maritime data sets and 1 air data set are shared. It is planned to progressively integrate more services depending on the availability of information, and more functionalities as they are developed.

Illustration 28. National Multimodal Transportation Access Point data sets. Source: Ministry of Transport and Sustainable Mobility

The National Multimodal Transportation Access Point received the ITS 2021 award in the Mobility as a Service (MaaS) category, a recognition from the Transportation Studies and Technology Division and the General Subdirectorate of Information Technologies and Digital Administration of the then Ministry of Transport and Sustainable Mobility

The Spanish National Access Point for MMTIS is continually improving.

The following sections provide more detailed information about the Spanish National Access Point for MMTIS.

2.1.3.1.1.1 Static Travel And Traffic Data

Spanish NAP for MMTIS collects available static travel information for road, rail, air and maritime transport, which is offered free of charge to users and citizens in general.

Traveling information coverage is partial since the passenger transport sector in Spain is atomized and many passengers transport operators don´t have their transport services digitalized. Nevertheless, digitization efforts are being made by the passenger transport sector and also the Ministry of Transport of Spain is working on supporting digitization initiatives in this field. Currently, the Spanish NAP includes an average of 16.000 routes and 117.000 stops of scheduled transport.

2.1.3.1.1.2 Dynamic Travel And Traffic Data

Spanish NAP doesn't gather dynamic data. This project is currently focusing in collecting more static data and making it accessible to NAP users, prioritizing good coverage and quality of information. Implementation of dynamic data is expected to be carried out in the future.

2.1.3.1.1.3 Travel Information Service

Spanish NAP provides multimodal information to third parties, such as mobility platforms and apps.

Collaboration is established between Spanish NAP and some developers of travel information services. This collaboration allows us to know their needs and priorities.

2.1.3.1.1.4 Data Updates

Spanish NAP is frequently updated. It checks automatically for data updates from its data resources, several times a day, and collects the new data in case it has been updated. So, there is a maximum delay of only a few hours since a data resource updates its information and NAP is updated.

2.1.3.1.2 QUALITY CRITERIA

Within the framework of the EU EIP project, specifically in sub-activity 4.1 "Determining European ITS service quality" (2016-2021), guidelines on how to determine the quality of multimodal travel information services has been developed. Work is currently in progress on these aspects through the European NAPCORE project, which is a continuation of the EU EIP.

For the time being, at a national level, Spain has not yet defined specific quality objectives, but they will be set in accordance with that instruction.

2.1.3.2 Results of the assessment of compliance with the requirements set out in articles 3 to 8

2.1.3.2.1 ARTICLE 3: NATIONAL ACCESS POINT

Spain has already deployed its National Access Point for Multimodal Travel Information Services according to Commission Delegated Regulation (EU) 2017/1926. It was published in June 2021. The list of definitions and content described in the Commission Delegated Regulation have been considered for its implementation.

2.1.3.2.2 ARTICLE 4: ACCESIBILITY, EXCHANGE AND REUSE OF STATIC TRAVEL AND TRAFFIC DATA

Available static travel information data for multimodal information services are already included in the Spanish NAP. NAP website was published in June 2021. Currently there are several developers using the Spanish NAP information in their mobility apps for transport users. Of course, information is also available to use for normal users. We also know that Spanish NAP information is being used by some transport operators in order to coordinate their transport services with those of other transport operators.

2.1.3.2.3 ARTICLE 5: ACCESIBILITY, EXCHANGE AND REUSE OF DYNAMIC TRAVEL AND TRAFFIC DATA

Dynamic travel information data for multimodal information services are not yet included in the Spanish NAP, although it is expected to be included in the future.

2.1.3.2.4 ARTICLE 6: DATA UPDATES

As mentioned in the previous section, Spanish NAP checks for data updates from its data resources, in an automatic process carried out several times a day. There is a maximum delay of only a few hours since a data resource updates its information and NAP is updated. The data update rate of NAP has been set considering the rate of updating of data sources. It could be revised when necessary.

2.1.3.2.5 ARTICLE 7: LINKING TRAVEL INFORMATION SERVICES

Spanish NAP provides multimodal information to third parties, such as mobility platforms and apps.

Collaboration is established between Spanish NAP and some developers of travel information services. This collaboration allows us to know their needs and priorities.

2.1.3.2.6 ARTICLE 8: REQUIREMENTS FOR SERVICE PROVISIONS REUSE OF TRAVEL AND TRAFFIC DATA AND LINKING OF TRAVEL INFORMATION SERVICES

Licences and terms of use of NAP information for users and third parties have been established, according to the Commission Delegated Regulation.

2.1.3.3 Description of changes compared to previous reports

Spain has deployed its National Access Point for Multimodal Travel Information Services and has published it in June 2021. Its website link is https://nap.mitma.es/.

Although an important amount of static travel data is available at the Spanish NAP, travelling information coverage is partial since the passenger transport sector in Spain is atomized and many passengers transport operators don´t have their transport services digitalized. Digitization efforts are being made by the passenger transport sector and also the Ministry of Transport of Spain is working on supporting digitization initiatives in this field. Currently, the Spanish NAP includes an average of 16.000 routes and 117.000 stops of scheduled transport.

The Spanish NAP started offering basic functionalities, but it is constantly being improved. For instance, in 2023 we added some metadata information to the data sets and implemented not visual but very important improvements in the inner workings of Spanish NAP. We also improved some functions of the Spanish NAP web portal and some information it displays.

2.1.4 2.1.4 Reporting obligation under Delegated Regulation (EU) 2015/962 on the provision of EU-wide real-time traffic information services (priority action b)

2.1.4.1 Progress made in terms of the accessibility, exchange and re-use of the road and traffic data types.

2.1.4.1.1 NATIONAL ACCESS POINT (NAP)

Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 establishing the framework for the implementation of intelligent transport systems in the road transport sector and for interfaces with other modes of transport, includes among its priority areas the optimal use of data on the road network, traffic and travel. In this sense, there is a growing demand for the use and implementation of communication technologies in the automotive world, which will support new services and technological advances in road safety.

Within the framework of the aforementioned Directive, as well as its delegated regulations, a common access point must be established that allows information from different sources to be available to everyone and in a standard format.

In compliance with the above, the General Directorate of Traffic put into operation a national access point, as already indicated in the 2017 and 2020 reports, for traffic information (hereinafter, NAP) that provides traffic information in high quality real time.

In order for the development and implementation of this National Access Point to meet the minimum requirements that guarantee its correct functioning, as well as to be updated on all the improvements and advances that can be made in this regard, the DGT actively participates in various groups. work within the framework of the NAPCORE project (National Access Point Coordination Organization for Europe).

The NAP (https://nap.dgt.es/) collects traffic information publications from the entities listed below:

- Directorate General of Traffic (DGT): http://www.dgt.es/
- General Directorate of Roads of the MTMS: https://www.mitma.gob.es/
- Traffic Department of the Basque Government (DT-GV): http://www.trafikoa.eus/
- Catalan Traffic Service (SCT): http://transit.gencat.cat
- Madrid City Council: http://datos.madrid.es/portal/site/egob
- HERE: https://www.here.com/
- TOMTOM: https://www.tomtom.com/

Illustration 29. National Traffic and Mobility Access Point. Source: NAP DGT

2.1.4.1.2 LINCE

LINCE is the acronym in Spanish for "Localizer of Incidents on the Roads of Spain", an application that contributes to the NAP. It is a centralised web system, used by the DGT, designed to allow the joint management of traffic events and traffic conditions on all roads controlled by the various Traffic Management Centres distributed throughout the country.

LINCE uses VEOS (Geolocalised Event Viewer) to be able to view, represent and search information about traffic events on the web map in real time.

The application has 1.250 users between Traffic Management Centres, Civil Guard Group and Provincial Traffic Headquarters.

At present, work is being done on an evolution of the application to place greater emphasis on the problem that will be encountered by the driver on the road.

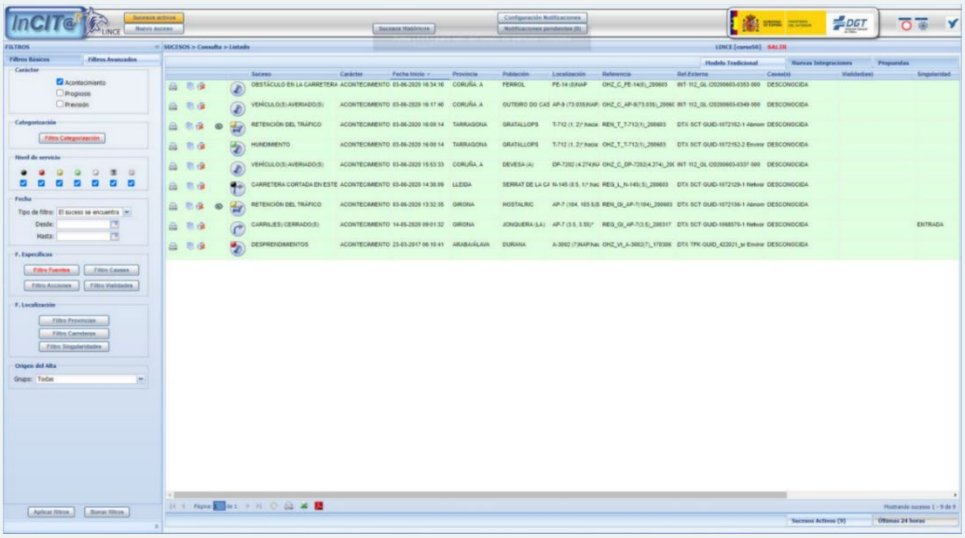


Illustration 30. LINCE application interface. Source: DGT

2.1.4.1.3 ARCO

At the beginning of the year, the DGT publishes in the Official State Bulletin (BOE – Boletín Oficial del Estado) a series of restrictions on the circulation of specific types of vehicles on certain road sections for certain dates. The ARCO application was developed to enable specialised management of this information.

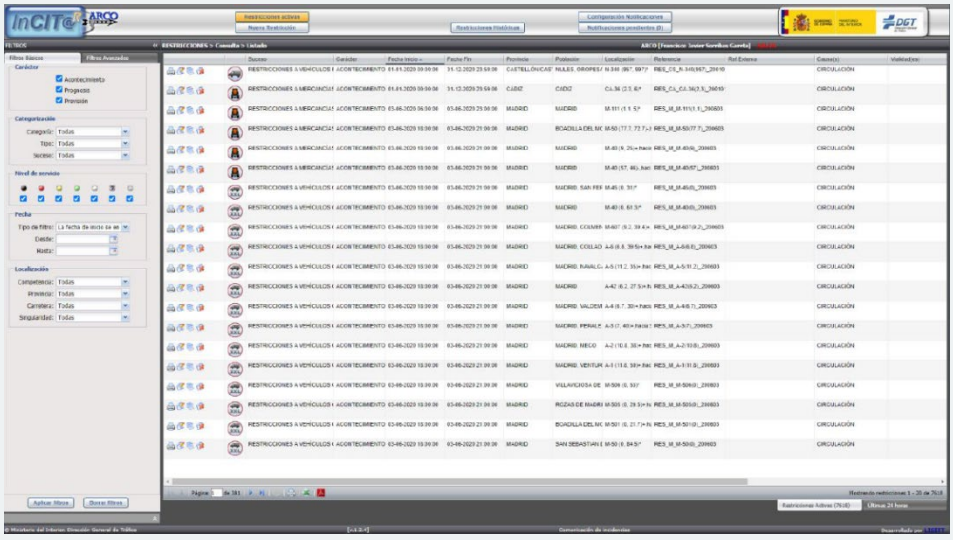


Illustration 31. ARCO application interface. Source: DGT

With ARCO, the traffic manager can enter all the information published in the BOE in an agile way. Furthermore, although this information does not usually change, there may be exceptional circumstances that mean that certain restrictions must be lifted early. Similarly, some restrictions may need to be extended. All this can be done with ARCO.

Once any operation is done with ARCO, it is automatically updated on the DGT website.

The restrictions can be applied to heavy vehicles, dangerous goods, vehicles that need additional authorisation, special vehicles, etc.

2.1.4.1.4 WINTER ROAD DASHBOARD (WRD)

This application was developed to provide real-time information related to winter road conditions. This tool is conceived as a live instrument, a composition of key aspects related to each other, which must be updated regularly and which, through its consultation, facilitates decision-making on mobility and road safety during the winter.

The WRD is programmed as a LINCE interface to complete the information provided by this platform. This web service has a limited access to certain users with competence in the matter. However, the information can be sent to all interested parties for the correct dissemination of the measures and/or actions to be carried out.

Illustration 32. Application WRD on LINCE. Source: DGT

The combination of quantitative and qualitative characteristics of roads is the best way to describe a specific scenario in detail. A graphic alternative that provides this information in a compact way is based on the creation of a mosaic of tables that initially includes concepts such as:

- Color-coded restriction levels.
- Number of kilometres of road network associated to each restriction level.
- Number of events related to winter maintenance.
- Aggregated information by type of road, province, TMC, etc.

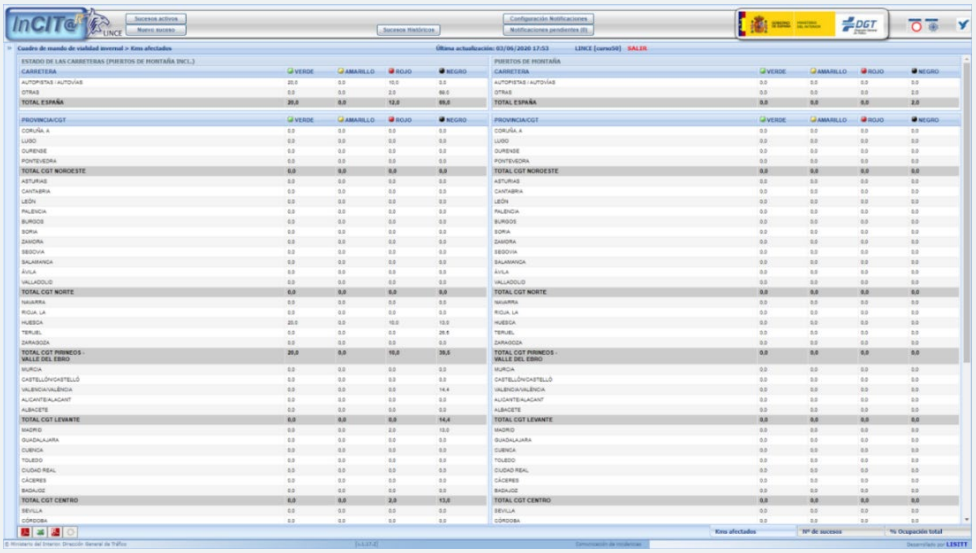


Illustration 33. Kilometers of roads affected. Source: DGT

In short, the WRD is a simple scheme, but with great added value, as it provides enough information to make decisions and assess road conditions in adverse weather episodes.

This nationwide application has been developed by the DGT. The DGC and other road owners have similar applications of their own but limited to the local level of the road networks they own and who supply their information to the DGT. The application of the DGC is integrated into the WRD.

2.1.4.1.5 CLOSED ROADS DASHBOARD

In order to provide real time information on all those road sections that cannot be driven on, a new section was developed in LINCE called "Cut Roads Dashboard". This tool is very useful for the manager to be able to quickly visualise all these road cuts.

It allows the export to Excel in a filtered way according to the geographic area that interests the traffic manager at that moment.

Illustration 34. Application of cut roads within LINCE. Source: DGT

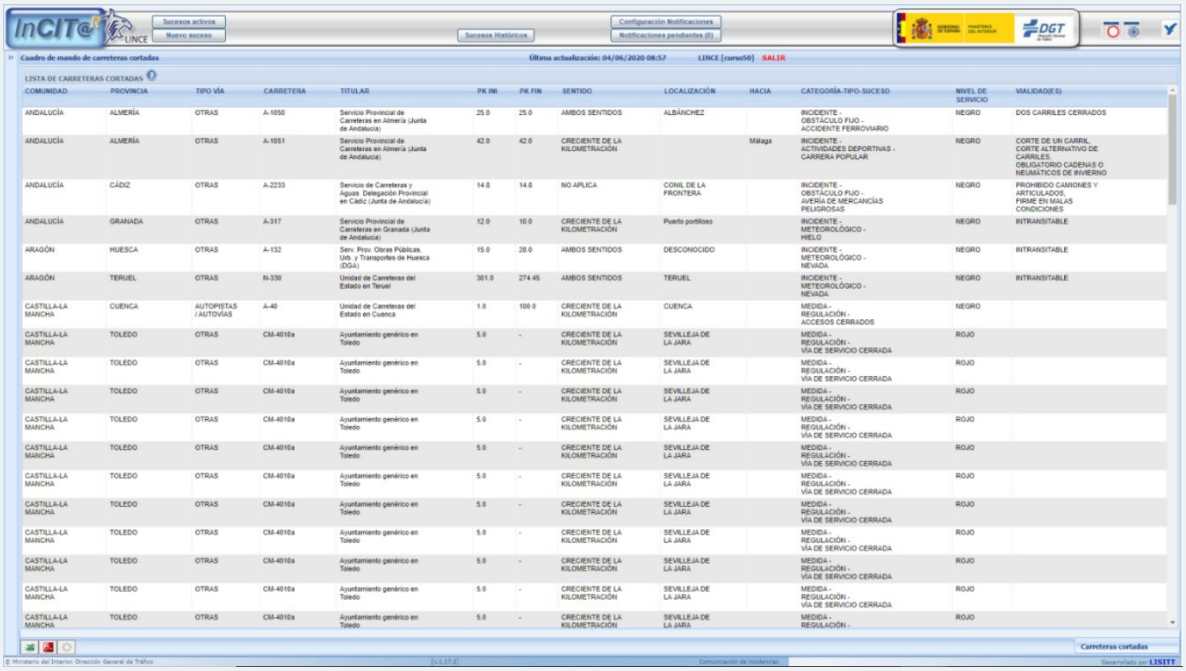


Illustration 35. Cut Roads Dashboard. Source: DGT

This nationwide application has been developed by the DGT. The DGC and other road owners have similar applications of their own but limited to the local level of the road networks they own and who supply their information to the DGT.

2.1.4.1.6 RENO

One of the problems often encountered by the driver on the road is that of roadworks, which, although unavoidable can affect traffic, it is important for the driver is well informed before he or she reaches the affected stretch of road and to be more reactive in order to avoid a possible accident. This is important both for that driver and for the operators on the road carrying out the specific works.

To achieve this, the RENO application (Ratification of Work Expeditions) was created, which obliges road maintenance companies to notify their actions on the entire road network in real time.

RENO is a simple web application adapted for mobiles, so that the operators themselves can inform with precision of the condition that the work is having at each moment on the road,

allowing them to inform of the lane or lanes that they are being forced to cut. Likewise, it will allow to inform about the moment when the works are finished.

Prior to this, the road maintainer will have had to request a permit from the DGT to carry out the work and this will be used by RENO to update the information.

All RENO's operations allow having valuable and updated information on the DGT's website, which is also made available to third parties through the NAP.

This nationwide application has been developed by the DGT. The DGC and other road owners have similar applications of their own but limited to the local level of the road networks they own and who supply their information to the DGT.

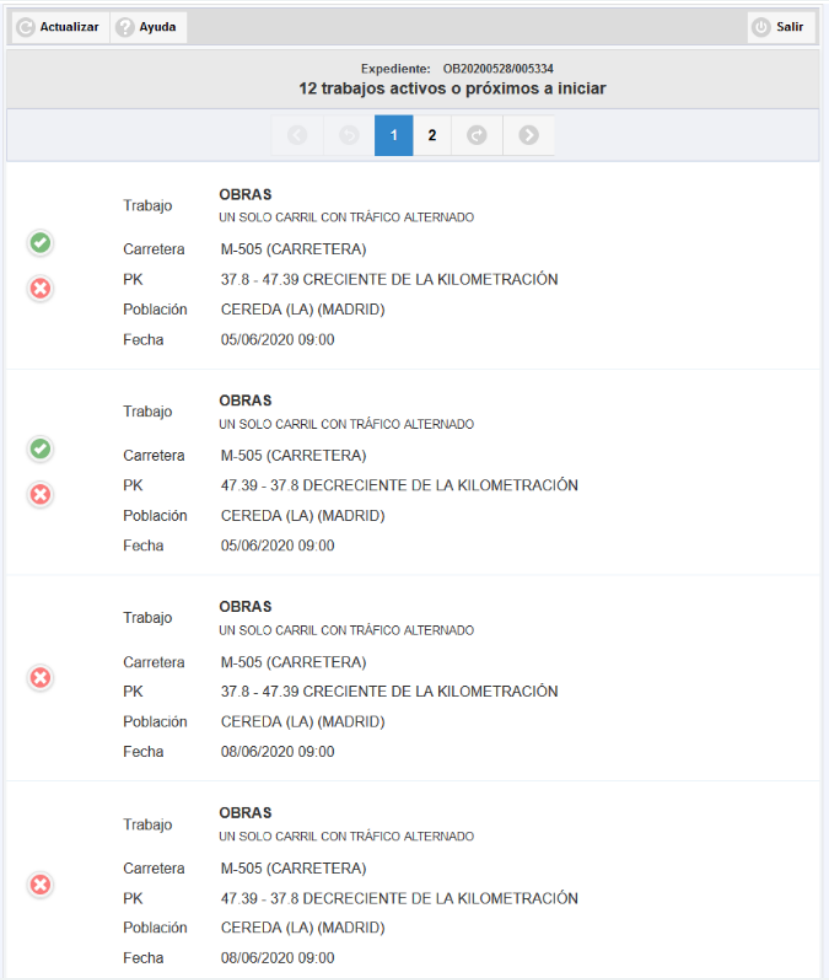


Illustration 36. Example of file and active work in the RENO application. Source: DGT

2.1.4.1.7 IGLU

IGLU's objective is to enable road operators to feed the NAP directly with real-time data on winter road conditions to provide high quality information to facilitate traffic management.

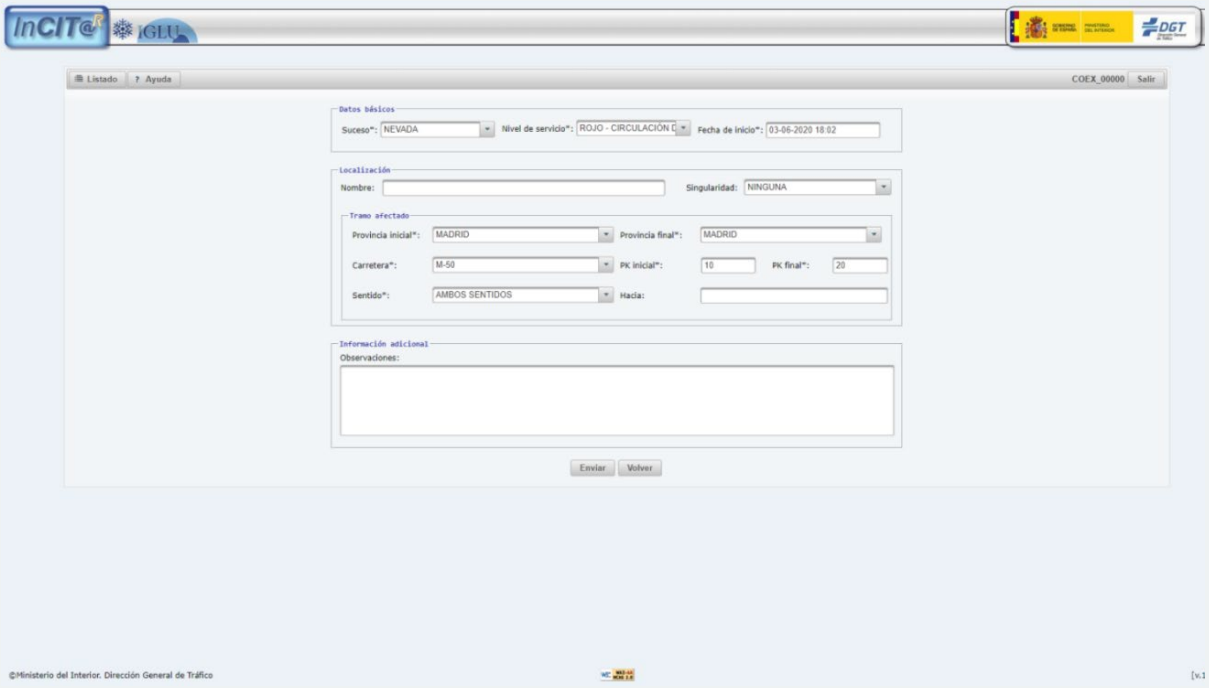


Illustration 37. IGLU main application interface. Source: DGT

The following list shows the characteristics for each incident:

- LOS: icon indicating the type of incident and the impact on the road.
- Incident: describes the type of event, among the following:
  - Snow: snow on the road
  - Ice: risk of slippage caused by ice on the road
  - Snowplough/salt shows the snowploughs that are used to clear the roads. This type of event does not have any associated LOS.
- Location: road, KP interval and direction in which the event is located.
- Province: province where the incident took place.
- Date: date of last modification.
- Singularity: special characteristics of the location of the incident.

IGLU allows road operators to continuously update the evolution of any incident.

2.1.4.1.8 VIGIA

To complete the information given about traffic problems on the roads, often the most illustrative thing is to have a picture of the road status. From this idea, the VIGIA project was born so that the citizen can see in an updated way the status of certain images from cameras installed in most of the roads in Spain.

The DGT has 1.744 video surveillance cameras that serve to "have eyes" in those points that can be more conflictive, but also not only traffic managers can benefit from these cameras but the citizen him/herself can view images that will be updated every few minutes thanks to the VIGIA system.

The VIGIA system is in charge of scanning all the cameras, capturing each one of them and publishing them on the Internet so that they are visible through the DGT website and also through third party applications.

It should be noted that there is the possibility of not publishing this information at certain times at the discretion of the DGT in order to avoid misuse of the image that may be made in specific situations, such as a traffic accident.

It is also important to mention that this project is adapting to the technological changes in the installations of the DGT cameras, being able to capture those cameras installed longer ago that work through analogy technology, as well as those more modern ones that use digital technology.

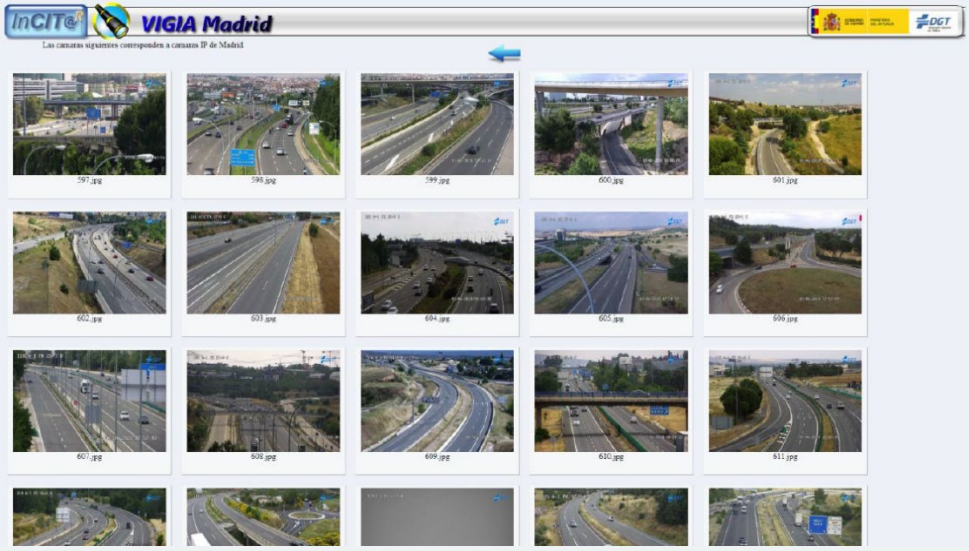


Illustration 38. VIGIA application interface. Source: DGT

2.1.4.1.9 MOBILITY MAP

The mobility map is a web application linked to the NAP that offers static and dynamic traffic information of all Spanish roads (national, regional and local).

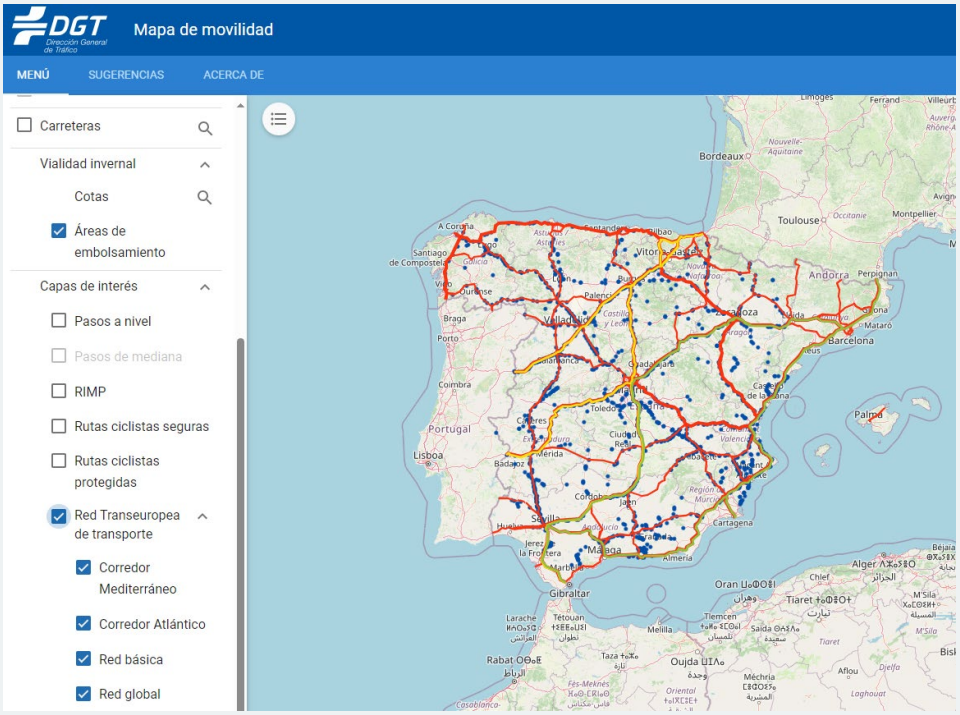


Illustration 39. Main interface of the Mobility Map. Source: [Mobility Map DGT]

The Mobility Map provides an interactive interface where users can view the following information:

- Kilometric points
- High accident concentration sections
- Restrictions
- Special surveillance areas
- Roads
    - Information related to adverse weather conditions
        - Elevation
        - Emergency parking areas
    - Other layers of interest:
        - Level - crossings
        - RIMP (Red de Itinerarios para Mercancías Peligrosas – Itineraries Network for Dangerous Goods)
        - Safe cycling routes
        - Protected cycling routes
        - Trans-European Transport Network
            - Atlantic Corridor
            - Mediterranean Corridor
            - Core Network
            - Comprehensive Network
        - Traffic-Lights
- Meteorology
    - Observation (AEMET radar)
    - Forecast
- La Palma volcano viewer

The mobility map facilitates the search for accurate information on the above parameters.

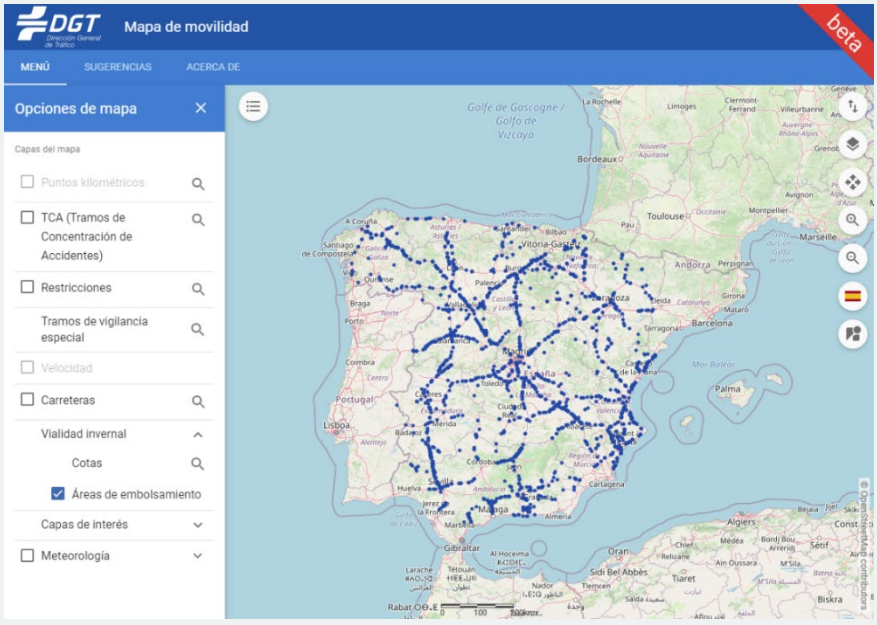


Illustration 40. Mobility map - Bagging areas. Source: [DGT Mobility Map]

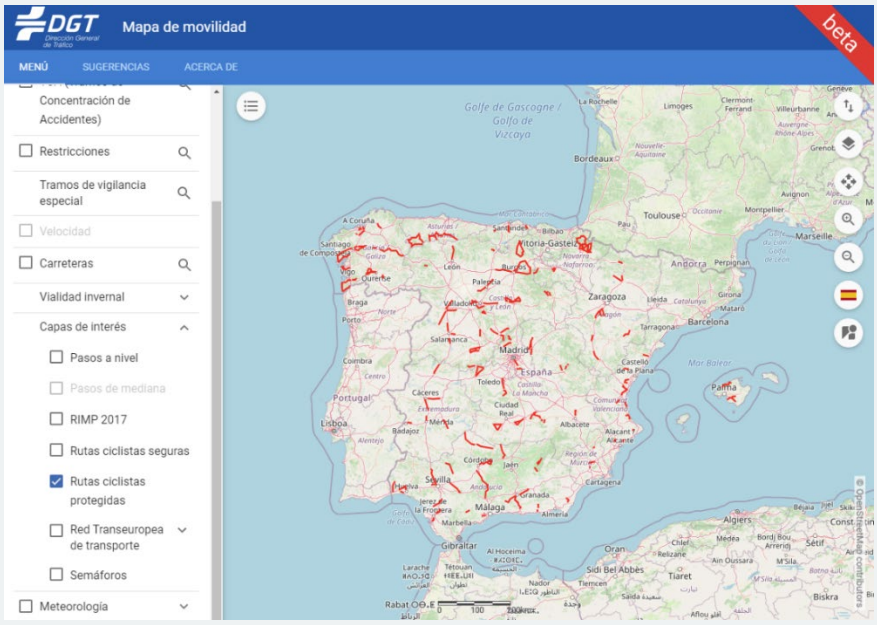


Illustration 41. Mobility map - Protected cycling routes. Source: DGT Mobility Map

This nationwide application has been developed by the DGT. The DGC and other road owners have similar applications of their own but limited to the local level of the road networks they own and who supply their information to the DGT.

2.1.4.1.10 INFOCAR – ETRAFFIC

This service, developed by DGT, is an example of integration of the information provided by the NAP into a traffic map. On this map it is possible to visualise the following information:

- Incidents updated in real time on national roads based on the information registered in the NAP.
- Scheduled works and restrictions (height and mass).
- Traffic data.
- Customised services:
    - Storage of the most frequent consultation areas.
    - Personalisation of the most relevant services for the user (cameras, panels, etc.).
    - Choice of basic cartography on the map.

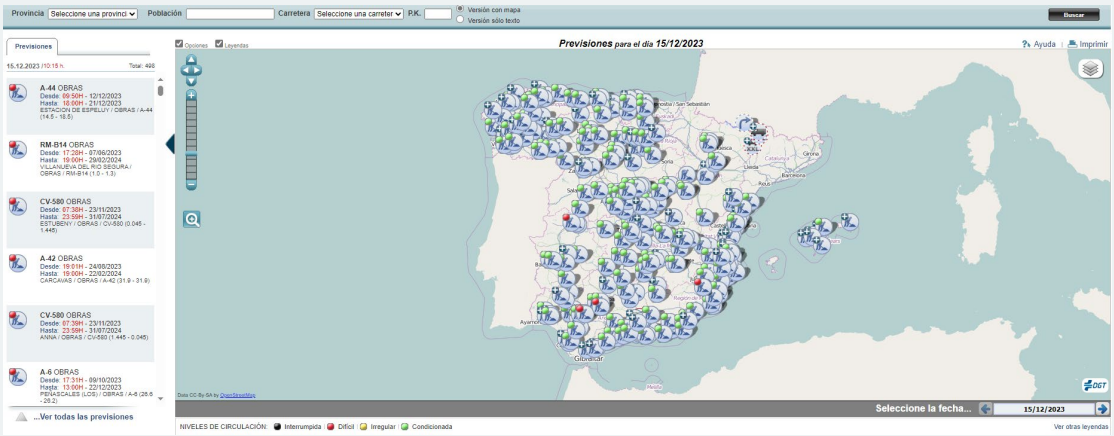


Illustration 42. Interface Infocar - Forecasts. Source: Infocar

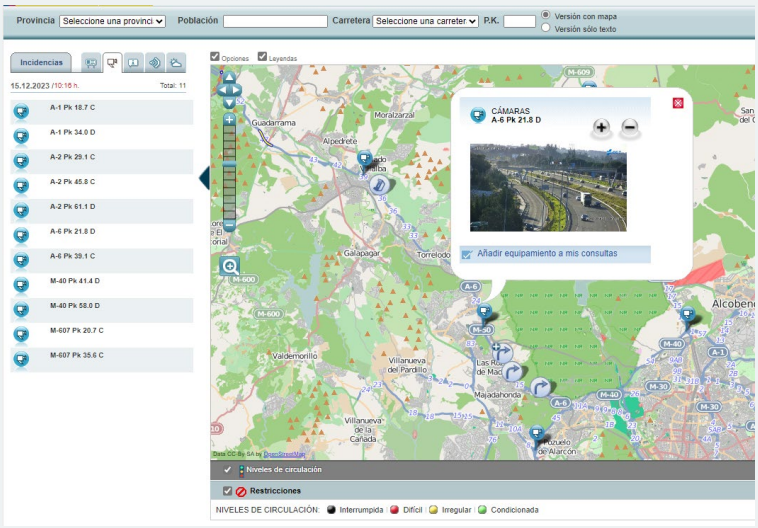


Illustration 43. Interface Infocar - Cameras. Source: Infocar

2.1.4.1.11 METEORUTA

This tool links the traffic with AEMET and, through it, it is possible to consult information related to the meteorological variables that can affect driving (rain, snow, wind, low temperature) and their temporary evolution during the following 24 hours.

It consists of a map with an interactive viewer, which shows the weather conditions of the roads by means of a warning layer updated according to AEMET.

This information is automatically generated by the statistical processing of the results of the numerical prediction models.

It is possible to visualise all the information related to the different meteorological phenomena that define the status of the road.

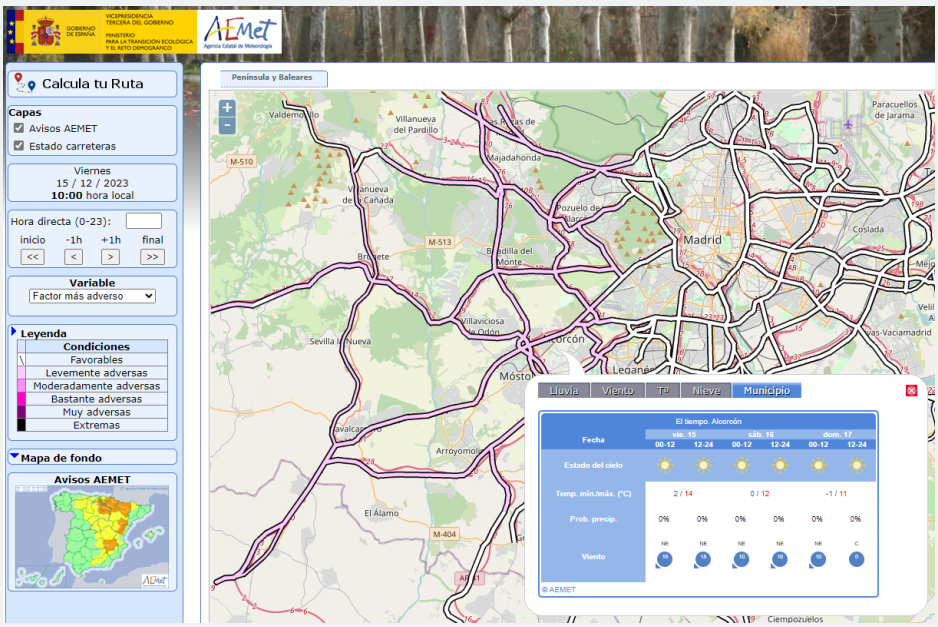


Illustration 44. MeteoRuta - Municipality detail. Source: MeteoRuta

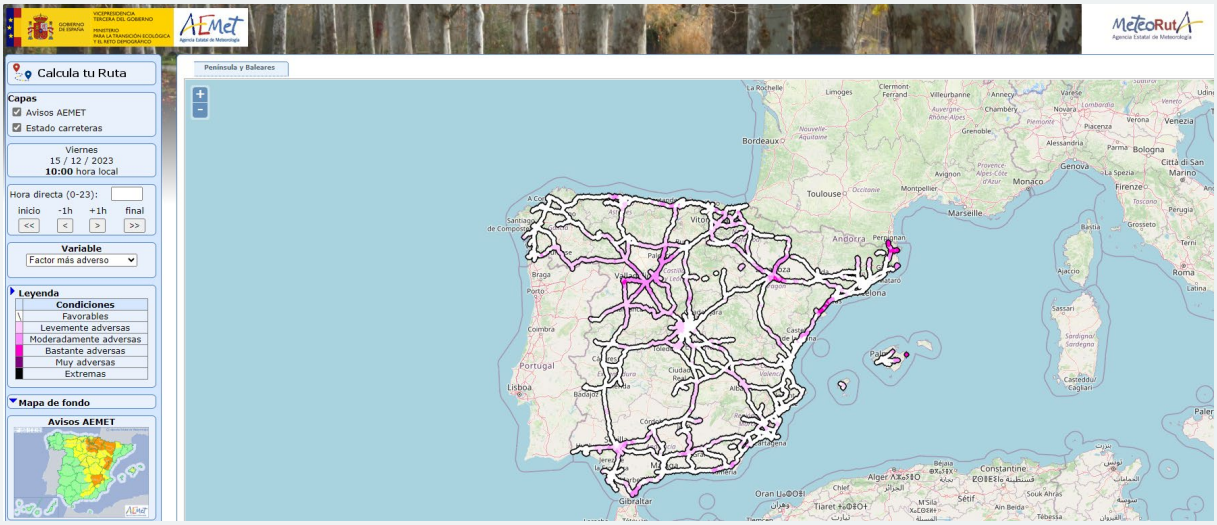


Illustration 45. MeteoRuta - Main interface. Source: MeteoRuta

2.1.4.1.12 SPORTS EVENTS AND TRAFFIC RESTRICTIONS

In the event that interurban roads are affected and, in accordance with Spanish regulations, each sporting event must be communicated to the DGT, including the duration of the event and the routes where the traffic information is useful. This data is available at the NAP for all users.

In addition, at the beginning of the year, the DGT publishes a calendar of scheduled sports events that affect interurban roads.

Since 2014, DGT publishes a regulation on traffic restrictions which takes into account road safety, mobility and efficiency during the dates when the traffic forecast is highest, considering possible risks from specific vehicles such as heavy vehicles. This information is available through Infocar and efforts are being made to include it in the NAP in the near future.

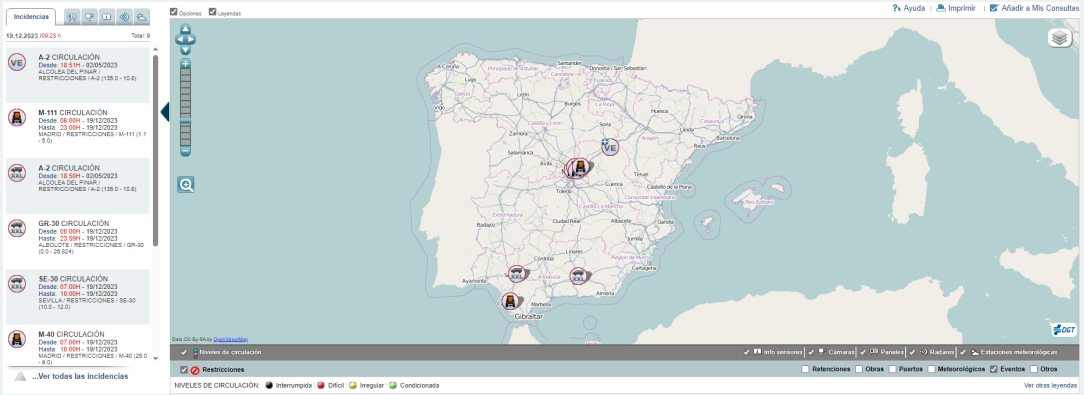


Illustration 46: Infocar restrictions. Source: Infocar-DGT

2.1.4.2 Coverage of EU-wide real-time traffic information services in Spain

It is possible to identify some relevant roads that are not included in the Global Network, according to the inventory of trans-European roads reflected in the "TENtec Interactive Map Viewer" of the European Commission and that should be covered with ITS services.

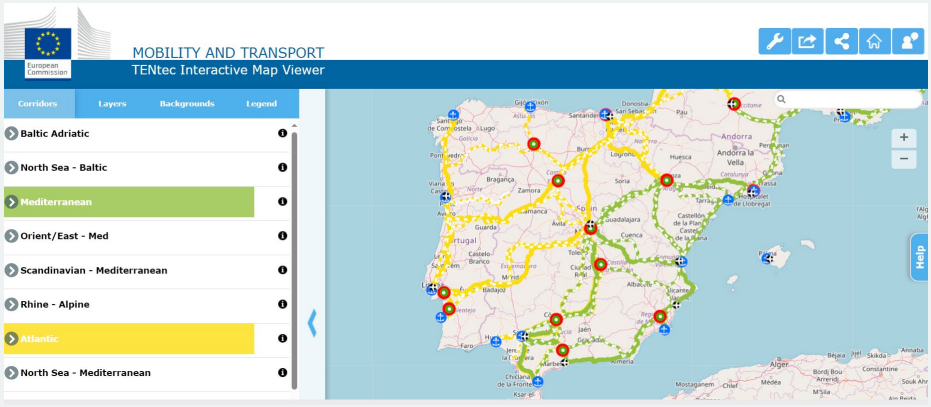


Illustration 47: TENtec interactive map interface. Source: European Commission

Below is a classification of some main roads in Spain that are not included in this classification; these specifications will cover most of the Spanish road network, regardless of their category.

The following table shows the high-capacity Spanish roads not included in the TEN-T network:

Table 57: Major high-capacity roads not included in the Trans-European Road Network. Source: Own Elaboration

TYPOLOGY	ROAD	ITINERARY
Motorway	A-1	De Miranda de Ebro (L.P. Burgos) a Treviño oeste (L.P. Burgos)
Motorway	A-1	De Treviño este (L.P. Burgos) a Ziordia (L.P. Navarra)
Motorway	A-1	De Pto. Etxegárate (L.P. Navarra) a San Sebastián (AP-8)
Motorway	A-1	De Ziordia (L.P. Álava) a Pto. Etxegárate (L.P. Guipúzcoa)
Motorway	A-11	Valladolid - Tudela del Duero
Motorway	A-11	El burgo de Osma
Motorway	A-12	Rioja
Motorway	A-12	De Pamplona (A-15) a Viana (L.P. La Rioja)
Motorway	A-13	Rioja
Motorway	A-14	Lleida
Motorway	A-15	De Areso (L.P. Navarra) a Villabona (N-I)
Motorway	A-15	De Noáin (AP-15 y PA-30) a Berriozar (AP-15 y PA-34) (Ronda de Pamplona Oeste)
Motorway	A-15	De Irurtzun (AP-15 y A-10) a Areso (L.P. Guipúzcoa) (Autovía de Leitzarán)
Motorway	A-2	Madrid - Barcelona
Motorway	A-2	Sils (enlace N-II con C-63) - Fornells de la Selva (enlace E-15)
Motorway	A-21	De Noáin (AP-15) a Yesa (N-240 L.P. Zaragoza) (Autovía del Pirineo)
Motorway	A-231	De Osorno (L.P. Palencia) a Villalbilla de Burgos (BU-30)
Motorway	A-231	De Onzonilla (N-630 y A-66r) a Sahagún (L.P. Palencia)
Motorway	A-231	De Sahagún (L.P. León) a Osorno (L.P. Burgos)
Motorway	A-26	Besalú (Enlace N260 con C-66) - Olot
Motorway	A-27	Tarragona
Motorway	A-316	De Úbeda oeste (A-401) a Martos oeste (Autovía del Olivar)
Motorway	A-318	De Lucena (A-45) a Cabra (A-339) (Autovía del Olivar)
Motorway	A-32	Bailén (enlace A-44) - Úbeda (enlace N-322)
Motorway	A-33	Estación de Blanca (A-30) - (enlace N-344)
Motorway	A-334	De Fines a Albox

TYPOLOGY	ROAD	ITINERARY
Motorway	A-357	De Casapalma a Málaga (Autovía del Guadalhorce)
Motorway	A-376	De Montequinto a Utrera norte
Motorway	A-38	Valencia
Motorway	A-381	De Jerez de la Frontera (AP-4) a Los Barrios (A-7) por Medina Sidonia
Motorway	A-382	De Jerez de la Frontera (AP-4) a Arcos de la Frontera (A-384, A-372 y A-393)
Motorway	A-383	De A-7 a La Línea de la Concepción (norte)
Motorway	A-395	De Granada sur (A-44) a túneles del Serrallo (Ronda sur de Granada)
Motorway	A-4	jerez de la frontera - Polígono tres caminos
Motorway	A-40	Cuenca – Tarancón - Ocaña
Motorway	A-42	Madrid - Toledo
Motorway	A-45	Antequera (A-92/N-331) - Málaga (A-7)
Multi Lane	A-45	Málaga
Motorway	A-48	Cádiz (CA-33) - Vejer de la frontera (N-340)
Motorway	A-480	De Sanlúcar de Barrameda (Camino de la Reyerta) a Jerez de la Frontera (N-IV)
Motorway	A-483	De Bollullos del Condado (A-49) a Almonte sur (A-474)
Motorway	A-491	De Base de Rota (P.K 15) a El Puerto de Santa María (A-4)
Motorway	A-497	De Huelva a Punta Umbría (A-5050)
Motorway	A-51	Ávila
Motorway	A-58	Trujillo (E-90) -Cáceres (N521)
Motorway	A-6	Betanzos - A Coruña
Motorway	A-60	Valladolid - León
Motorway	A-601	De Viloria (L.P. Valladolid) a Segovia (SG-20 y CL-601)
Motorway	A-601	De Valladolid (VA-30) a Viloria (L.P. Segovia)
Motorway	A-610	De Palencia a Magaz de Pisuerga (N-620)
Motorway	A-66	Onzonilla - Benavente
Motorway	A-67	Aguilar de Campo - Palencia
Multi Lane	A-68	
Motorway	A-68	Tudela
Motorway	A-68	De Castejón (AP-15 y N-232) a Cortes de Navarra (N-232)
Motorway	A-7	Marbella - Fuengirola
Motorway	A-7	Estepona - Marbella
Motorway	A-7/N-340	Tarragona
Motorway	A-70	San Juan de Alicante - Bonavista
Motorway	A-7056	De A-357 a Parque Tecnológico de Andalucía (A-7054)
Motorway	A-77	Alicante
Motorway	A-77A	Alicante
Motorway	A-79	Alicante
Motorway	A-7N	Murcia
Motorway	A-8009	De Sevilla (SE-20) a La Rinconada (A-8004)
Motorway	A-8028	De SE-30 a Torreblanca de los Caños (A-92) (vía borde de "El Pino")
Motorway	A-8062	De Bormujos (A-474) a Gines (A-8076)
Motorway	A-91	Murcia
Motorway	A-92	De Huéneja (L.P. Granada) a Tabernas (N-340a)

TYPOLOGY	ROAD	ITINERARY
Motorway	A-92	De L.P. Málaga a Huéneja (L. P. Almería) por Loja y Granada
Motorway	A-92	De La Roda de Andalucía (L.P. Sevilla) a L.P. Granada por Archidona
Motorway	A-92	De Sevilla (SE-30) a La Roda de Andalucía (L.P. Málaga)
Motorway	A-92G	De Santa Fe (A-92) a Granada (A-44)
Motorway	A-92M	De Estación de Salinas (A-92) a Villanueva de Cauche (A-45)
Motorway	A-92N	De Puerto de El Contador (L.P.Granada) a L.P. Murcia (A-91) por Vélez Rubio
Motorway	A-92N	De Guadix (A-92) a Puerto de El Contador (L.P. Almería) por Baza y Cúllar
Motorway	AC-10	A Coruña
Motorway	AC-11	A Coruña
Motorway	AC-12	A Coruña
Motorway	AC-14	A Coruña
Motorway	AC-14AL	A Coruña
Motorway	AG-11	De Padrón (N-550) a Ribeira (AC-550) (Autovía del Barbanza)
Motorway	AG-13	De O Castelo (VG-1.3) a Coiro (N-VI Km 583,200)
Motorway	AG-31	De San Cibrao das Viñas (A-52) a Celanova sur
Motorway	AG-41	De Curro (AP-9) a Sanxenxo (VG-4.1 y PO-504)
Motorway	AG-51	De Lira (A-52 salida 291 y EP-4102) a Currás (PO-402)
Motorway	AG-53	De Piñor (L.P. Pontevedra) a Barbantes (A-52)
Motorway	AG-53	De Dozón (AP-53) a Piñor (L.P. Ourense)
Motorway	AG-54	De Maside (AG-53) a O Carballiño (N-541)
Motorway	AG-55	De A Coruña (AC-552) a Carballo oeste (AC-552)
Motorway	AG-55	De Carballo oeste (AC-552) a Baio (AC-430 y VG-1.5)
Motorway	AG-55	De Baio norte a Santa Irene (AC-552)
Motorway	AG-56	De Santiago de Compostela sur (SC-20 y AP-9) a Brión (AC-543)
Motorway	AG-57	De Baiona (PO-552) a Vigo sur (VG-20) (Autopista do Val Miñor)
Motorway	AG-57N	De AG-57 a Nigrán
Motorway	AG-58	De Penelas (AG-59 Km 1) a Cacheiras (AC-841)
Motorway	AG-59	De Ostilos (AC-537) a A Ramallosa (AC-841)
Motorway	AG-64	De Ferrol a L.P. Lugo por As Pontes de García Rodríguez (Autovía)
Motorway	AG-64	De L.P. A Coruña a Vilalba (A-8 y LU-861) por Cabreiros (Autovía)
Motorway	AI-81	Avilés
Motorway	AI-82	Avilés
Motorway	AP-1	De Etxabarri-Ibiña (N-622 y N-624) a Léniz (L.P. Gipuzkoa)
Motorway	AP-1	De Léniz (L.P. Alava) a Eibar (AP-8)
Motorway	AP-15	De Tudela (AP-68) a Noáin (A-15 y PA-30)
Motorway	AP-15	De Berriozar (A-15 y PA-34) a Irurtzun (A-15 y A-10)
Motorway	AP-2	Lleida - Villafranca de Ebro
Motorway	AP-36	Ocaña-La Roda
Motorway	AP-36	Ocaña-La Roda
Motorway	AP-4	Jerez de la Frontera - Sevilla
Motorway	AP-41	Madrid - Toledo
Motorway	AP-46	Puerto de las Pedrizas - Málaga
Motorway	AP-53	Santiago - Dozón
Motorway	AP-61	Segovia - El Espinar

TYPOLOGY	ROAD	ITINERARY
Motorway	AP-66	Campomanes - Rioseco de Tapia
Motorway	AP-71	Astorga - León
Motorway	AP-8	De Eibar (L:P. Gipuzkoa) a Basauri (A-8)
Motorway	AP-8	De Bilbao sur (A-8 y BI-631) a Valle de Trápaga (A-8)
Motorway	AP-8	De Behobia (Frontera Francia) a Eibar (L.P. Bizkaia)
Motorway	ARA-A1	De Villafranca de Ebro (N-II) a El Burgo de Ebro (N-232) (Autopista)
Motorway	AS-117	De Riaño (AS-I y AS-116) a Sama de Langreo
Motorway	AS-17	De Posada sur (Pol. Ind. Asipo) a Lugones (AS-266)
Motorway	AS-17	De Meres (A-64) a Riaño (acceso 37)
Motorway	AS-I	De Mieres (A-66) a Gijón por Pola de Siero (Autovía Minera)
Motorway	AS-II	De Oviedo a Gijón (Autovía Industrial)
Motorway	B-22	Barcelona
Motorway	B-23	Barcelona
Motorway	B-23	Barcelona
Motorway	B-24	Barcelona
Motorway	B-30	Barcelona
Motorway	B-40	Barcelona
Motorway	BI-626	De Puente La Salve a (N-637)
Motorway	BU-11	Burgos
Motorway	BU-12	Burgos
Motorway	C-13	De Lleida sur (LL-12) a Els Magraners (C-13B)
Motorway	C-13	De Vilanova de la Barca sur (C-13Z) a Termens sur
Motorway	C-13B	De C-13 y N-240 a LL-11
Motorway	C-16	De Barcelona a Terrassa sur (C-58)
Motorway	C-16	De Terrassa sur (C-58) a Viladecavals
Motorway	C-16	De Viladecavals a Sant Fruitos de Bagès (C-25)
Motorway	C-17	De Centelles sur a Montesquiu (L.P. Girona)
Motorway	C-17	De Montesquiu (L.P. Barcelona) a Ripoll (C-26)
Motorway	C-25	De Ferran (L.P. Lleida) a Manresa (BV-4501)
Motorway	C-31	De Castelldefels (C-32) a L'Hospitalet de Llobregat
Motorway	C-31	De Barcelona (plaza Les Glòries) a El Masnou (C-32 y B-20)
Motorway	C-31C	Sant Boi de Llobregat (A-16) - El Prat de Llobregat (B-17)
Motorway	C-32	De Cubelles (L.P. Tarragona) a Castelldefells
Motorway	C-32	De Montgat (B-20 y C-31) a Palafolls (N-II)
Motorway	C-32	De Castelldefells a Barcelona (Av. Diagonal)
Motorway	C-32	De El Vendrell (AP-7) a Cubelles (L.P. Barcelona)
Motorway	C-33	De Barcelona (Avda. Río de Janeiro) a Montmeló (A-7)
Motorway	C-35	De Maçanet de la Selva (AP-7) a Llagostera (C-65)
Motorway	C-58	De Barcelona (C-33) a Terrassa (C-16)
Motorway	C-60	De Mataró (C-32 y B-40) a La Roca del Vallés (AP-7) (Autovía de La Roca)
Motorway	C-65	De Santa Cristina d'Aro a Llagostera (C-35)
Motorway	CA-31	Cádiz
Motorway	CA-32	Cádiz
Motorway	Ca-33	Cádiz
Motorway	CA-34	Cádiz

TYPOLOGY	ROAD	ITINERARY
Motorway	CA-34	San Roque (Cádiz)
Motorway	CA-36	Cádiz
Motorway	CA-37	Puerto Real (Cádiz)
Motorway	CL-631	De Cubillos del Sil a Toreno
Motorway	CM-10	Ronda norte de Guadalajara (de A-2 km 59 a N-320 por Río Henares)
Motorway	CM-40	Ronda suroeste de Toledo (de Bargas (A-40) a Nambroca (CM-42 y N-401))
Motorway	CM-41	De Valmojado (A-5) a Illescas (A-42 y CM-43) (Autovía de la Sagra)
Motorway	CM-42	De Villafranca de los Caballeros (L.P. Toledo) a Villafranca de los Caballeros (L.P. Toledo)
Motorway	CM-42	De Alcázar de San Juan (L.P. Toledo) a Tomelloso (A-43)
Motorway	CM-42	De Toledo (N-401 y A-42) a Herencia (L.P. Ciudad Real)
Motorway	CM-42	De Alcázar de San Juan (L.P. Ciudad Real) a Alcázar de San Juan (L.P. Ciudad Real)
Motorway	CM-43	De Illescas (A-42 y CM-41) a Añover de Tajo (CM-4004)
Motorway	CM-45	De Ciudad Real (A-41 y CM-4111) a Almagro (CM-412)
Motorway	CO-31	Córdoba
Motorway	CO-32	Enlace A-45 - Enlace N437 (Córdoba)
Motorway	CS-22	Castello de la Plana (Castellón)
Motorway	CT-31	Enlace RM-332 - Enlace AP-7 (Cartagena, Murcia)
Motorway	CT-32	Cartagena (Murcia)
Motorway	CT-33	Entre calle paseo del Muelle y N-332 (Cartagena, Murcia)
Motorway	CT-34	Enlace CT-32 - Enlace N-343 (Cartagena, Murcia)
Motorway	CV-30	De V-30 a CV-31 por Ronda Norte de Valencia
Motorway	CV-336	De San Antonio de Benagéber (CV-35) a Bétera
Motorway	CV-35	De Valencia (CV-30) a Casinos por Lliria
Motorway	CV-36	De Valencia (V-30) a Torrent (A-7) por Picanya
Motorway	CV-50	De Alzira (CV-42 y CV-43) a L'Alcúdia (A-7)
Motorway	CV-50	De Benaguasil (CV-364) a Llíria (CV-35)
Motorway	CV-500	De puerto de Valencia (V-30) a El Saler
Motorway	CV-80	Finaliza en el enlace con A-7. Alicante
Motorway	CV-80	De Sax (A-31) a Castalla norte (CV-806 y CV-815)
Motorway	EL-20	Desde la AP-7. Elx. (Alicante)
Motorway	EL-20	Elx. (Alicante)
Motorway	EX-A1	De Navalmoral de la Mata oeste (A-5) a Moraleja (EX-108)
Motorway	EX-A2	De Miajadas (A-5) a Vivares (L.P. Badajoz)
Motorway	FE-11	Enlace FE-14 - AC-862 (A Coruña)
Motorway	FE-12	Enlace AP-9 - Enlace CP-5401
Motorway	FE-13	Enlace FE-14 - Enlace AC-116 . (Ferrol, A Coruña)
Motorway	FE-14	Fene - Ferrol (A Coruña)
Motorway	FE-15	Ferrol
Motorway	GC-1	De Las Palmas de Gran Canaria (GC-1 AM) a Arguineguín (GC-200) (Autovía Marítima)
Motorway	GC-1 AM	Avda. Marítima Las Palmas de Gran Canaria (Hoya de la Plata (GC-1) a Pza. Belén María)
Motorway	GC-10	De La Garita (rotonda de las Tazas) a Telde (GC-41) (Autovía de Telde)

TYPOLOGY	ROAD	ITINERARY
Motorway	GC-2	De Las Palmas de Gran Canaria (GC-1) a Bañaderos (GC-330)
Motorway	GC-2	De Gáldar (GC-75) a Las Cruces (GC-220 y GC-293)
Motorway	GI-11	De Lasarte (N-I) a San Sebastián (GI-20)
Motorway	GI-20	Variante de San Sebastián (de Errentería (AP-8 a Aritzeta (AP-8))
Motorway	GI-41	De Astigarraga (AP-8) a San Sebastián (Autovía del Urumea)
Motorway	GI-632	De Beasain (N-I) a Urretxu - Legazpi
Motorway	GJ-81	Hasta enlace con A-8 (Gijón, Asturias)
Motorway	GR-14	Enlace A-7 - Enlace N-340 (Motril, Granada)
Motorway	GR-16	Enlace N-340 - A-7 (Motril, Granada)
Motorway	GR-16	Motril (Granada)
Motorway	H30	Desde el enlace con la N-431 (Huelva)
Motorway	H-30	Enlace HU-3101 - Enlace N-442 (Huelva)
Motorway	H-31	Enlace A-49 - Enlace H-30 (Huelva)
Motorway	H-31	Desde enlace H-30 (Huelva)
Motorway	LE-11	Enlace N-630 - Enlace A-231 (León)
Motorway	LE-11	León
Motorway	LE-20	León
Motorway	LE-20	Enlace N-630 - Enlace A-66 (León)
Motorway	LE-30	Enlace LE-20 - Enlace AP-71 (León)
Motorway	LL-11	Enlace LL-12 - Enlace A-2 (Lleida)
Motorway	LL-12	Enlace AP-2- Enlace LL-11 (Lleida)
Motorway	LO-20	Desde Enlace N-232 (Logroño, Rioja)
Motorway	LU-11	Coincide con la N-6 PK494 a PK 948 (Lugo)
Motorway	LU-12	Lugo
Motorway	M-100	De Alcalá de Henares (M-203 y M-300) a Alcalá de Henares (M-118)
Motorway	M-100	De M-111 y M-106 a A-1 (km 23)
Motorway	M-11	Enlace M-30 - Enlace M-111 (Madrid)
Motorway	M-110	Enlace M-13 (Madrid)
Motorway	M-12	Enlace E-5 - Enlace A-1 (Madrid)
Motorway	M-13	Enlace M-12 - Enlace M-110 (Madrid)
Motorway	M-14	Enlace E-5 - Aeropuerto de Barajas (Madrid)
Motorway	M-21	Enlace M-40 - Enlace A-2
Motorway	M-22	Madrid
Motorway	M-23	Madrid
Motorway	M-31	Enlace M-40 - Enlace M-50 (Madrid)
Motorway	M-40	Enlace A-1. Entero (Madrid)
Motorway	M-407	De Leganés (M-406) a Griñón (M-404 y M-415)
Motorway	M-45	De M-40 (Km 29) a San Fernando de Henares (M-50 y acceso A-2) por Leganés
Motorway	M-50	Enlace R-2 (Madrid)
Motorway	M-50	Enlace A-1 - Enlace A-6 (Madrid)
Motorway	M-501	De M-40 (km 36,500) a Navas del Rey (M-855) por Brunete
Motorway	M-503	De Majadahonda (M-50) a Villanueva de la Cañada (M-600)
Motorway	M-607	De Madrid (M-40) a Colmenar Viejo norte (M-609)
Motorway	M-609	De M-607 a Soto del Real (Centro penitenciario)

TYPOLOGY	ROAD	ITINERARY
Motorway	Ma-1	De Cala Major a Peguera
Motorway	Ma-13	De Palma de Mallorca (Ma-20) a Sa Pobla (Ma-2200 y Ma-3420)
Motorway	Ma-19	De Palma de Mallorca (C/ Manuel Azaña) a Llucmajor
Motorway	MA-20	Málaga
Motorway	Ma-20	Circunvalación de Palma de Mallorca (de Ma-19 a Ma-1)
Motorway	MA-22	Málaga
Motorway	MA-23	Málaga
Motorway	MA-24	Enlace A-7S (Málaga)
Motorway	ML-101	Melilla
Motorway	ML-204	Melilla
Motorway	ML-300	Melilla
Motorway	MU-30	Enlace A-7S - Enlace N-301 (Murcia)
Motorway	MU-31	Enlace MU-30 - Enlace A-30 (Murcia)
Motorway	R-2	Madrid
Motorway	R-3	Madrid
Motorway	R-4	Madrid
Motorway	R-5	Madrid
Motorway	RM-1	De San Javier (AP-7) a Zeneta (RM-F16)
Motorway	RM-11	De Lorca (N-340 enlace 541) a Águilas (RM-333 y RM-D14)
Motorway	RM-15	De Alcantarilla (A-7 y MU-30) a Caravaca de la Cruz (RM-730) (Autovía Río Mula)
Motorway	RM-16	De A-30 (P.K.-161) a Aeropuerto de Corvera
Motorway	RM-17	De los Martínez del Puerto (A-30) a RM-16 y RM-E7
Motorway	RM-19	De Puerto de la Cadena (A-30) a San Javier (AP-7) (Autovía)
Motorway	RM-2	De Alhama de Murcia (A-7) a A-30 (enlace 171 a Torre Pacheco) y RM-F14
Motorway	RM-23	De Alhama de Murcia (RM-2 y RM-603) a Canal del Taibilla (RM-3) (Autovía)
Motorway	RM-3	De Totana (A-7 salida 611) a Mazarrón (RM-332)
Motorway	TF-1	De Santa Cruz de Tenerife (TF-5) a Santiago del Teide (TF-375)
Motorway	TF-11	De Santa Cruz de Tenerife (Dique del Este) a San Andrés
Motorway	TF-5	De Santa Cruz de Tenerife a Los Realejos
Motorway	V-14	De AG-55 a As Rañas (AC-14)
Motorway	Z-40	Zaragoza

2.1.4.2.1 QUALITY CRITERIA

Within the framework of the EU EIP project, specifically in subactivity 4.1 “Determination of European ITS service quality” (2016-2021), guidelines have been developed on how to determine the quality of multimodal travel information services. Work is currently being done on these aspects through the European NAPCORE project, which is a continuation of the EU EIP.

At the moment, at the national level, Spain does not yet have specific quality objectives defined, but they will be set in accordance with that instruction.

2.1.4.3 Results of the assessment of compliance referred to in Article 11 with the requirements set out in Articles 3 to 10

2.1.4.3.1 ARTÍCULO 3: PUNTO DE ACCESO NACIONAL

As reflected throughout the document, DGT has developed a national access point which meets the requirements set out in Article 3 of the delegated regulation as it is explained in the following lines.

Spanish regulation sets that DGT is the public authority that has to provide Real Time Traffic Information, therefore it manages the NAP.

The NAP (http://nap.dgt.es/) is an access point for users where they can consult traffic and road data provided by different providers as specified in section 2.1.4.1.1.

All the information published within the national access point covers the different types of information considered in the delegated regulations: RTTI, SRTI, etc., it complies with the requirements arising from delegated acts adopted under directive 2010/40.

Along with NAP, all road and traffic information are referenced through different applications with dynamic maps linked to the NAP such as Infocar (described throughout the document). In addition, web applications from DGT have been designed following accessibility standards in websites that are regulated by the Web Accessibility Initiative (WAI) and developed by World Wide Web Consortium (W3C). Guidelines of Web content (WCAG 2.0) level AA have been implemented, following mandatory minimum level of priorities 1 and 2 of the Norma UNE 139803:2012. Therefore, the web site is accessible for all kind of users regardless the hardware or software.

Finally, all the information is verified before being made available to the user following different verification procedures (algorithms, verification through cameras, etc.). The information is shared in DATEX II (.xml) because it is the standard developed for the exchange of information in the European Union. Metadata is published in .html format for each type of information provided.

2.1.4.3.2 ARTICLE 4: ACCESSIBILITY, EXCHANGE AND RE-USE OF STATIC ROAD DATA

Static information is not provided yet through NAP. It can be available through the different applications like Mobility map and Infocar.

2.1.4.3.3 ARTICLE 5: ACCESSIBILITY, EXCHANGE AND RE-USE OF DYNAMIC ROAD STATUS DATA

The dynamic road status data collected by road authorities and road operators is made available to users in real time through tools like Infocar. And is also accessible through NAP for exchange and re-use.

It is published in DATEX II allowing the interchange of data.

All the information published through the national access point is open data that can be reused by any person or entity.

2.1.4.3.4 ARTICLE 6: ACCESSIBILITY, EXCHANGE AND RE-USE OF TRAFFIC DATA

The accessibility of traffic data is guaranteed thanks to the different applications like Infocar, and the information is linked to the national access point. Real-time traffic information is shared in DATEX II format, such as location of traffic queues, travel times -only through VMS-, etc. so all the data provided is published in a readable format or can be translated to a machine-readable format fully compatible and interoperable with DATEX II.

Again, as in previous sections, all the information published through the national access point are open data that can be reused by any person.

An example of the application of this article and the previous one is that DGT currently has a collaboration contract with WAZE, through which traffic information is exchanged to generate synergies. To this end, and as specified at the beginning of this section, the exchange of information is carried out in DATEX II format.

2.1.4.3.5 ARTICLE 7: DATA UPDATES

It can be stated that information updates of static, dynamic and traffic data are being carried out precisely and regularly and that there is a procedure for the revision of the information to be published so that its quality is optimal.

Updated information can come from a variety of traffic sources, such as devices on roads or, on occasion, from the Civil Guard itself, which detects and reports an incident.

2.1.4.3.6 ARTICLE 8, 9, 10: UPDATING STATIC, DYNAMIC ROAD STATUS DATA AND TRAFFIC DATA

Every time it is known about some kind of update or modification it is executed as soon as possible, so users have knowledge practically parallel to the acceptance of the change.

Dynamic road data updates are performed considering the completion of all those fields that must be taken into account for the correct updating (type of dynamic road status data, location of the event or condition -ensuring that the information is unambiguous-, period of occurrence and quality of the data update).

Updating dynamic road status data or traffic data is intimately linked to real-time traffic information, so any change executed on the former implies an automatic review of all real-time related publications in NAP.

NAP update frequency depends on the data provided, for example dynamic road status is updated every 2 minutes; and traffic data as traffic queues every 2 minutes as well.

2.1.5 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)

2.1.5.1 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

2.1.5.1.1 ROAD SAFETY-RELATED MINIMUM UNIVERSAL TRAFFIC INFORMATION FREE OF CHARGE TO USERS

Spain provides the information using different tools taking into account the list of road safety-related events or conditions which are described at the Commission Delegated Regulation (EU) No 886/2013. Most of this information is available at the NAP.

In addition, Traffic Management Centres (TMC) have deployed applications in order to obtain and manage relevant information which feeds the NAP.

Furthermore, in this scope DGT 3.0 platform is allowing an effective data exchange through cellular communication between components and actors of the mobility system, relevant use cases are available: messages about traffic incidents, hazardous locations, roadworks and stationary vehicles. National regulation has recently introduced the use of the V-16, a connected beacon device for drivers that will replace the traditional emergency triangle and the obligation for towing services to report their location. Similarly, the use case for connected road cones has recently been presented, which aims to promote protection through the NAP for those carrying out maintenance work.

Spain is also participating in the Safety Related Traffic Information (SRTI) Ecosystem created by the Data for Road Safety Multi Party Agreement for the exchange of data and information under the terms and conditions of the Agreement and thus creating a trust domain for that exchange.

2.1.5.1.1.1 Slippery road

This incident is being traditionally reported by road maintenance. Currently, DGT is working on getting this information through other sources; mainly, floating car data in the context of the Data for Road Safety Multi Party Agreement.

2.1.5.1.1.2 Animal, people, obstacles, debris on the road

Safety related information involving animals on the road, people, obstacles or debris on the road is generally reported through 112 (emergency number) or through 011 (traffic assistance number). As soon as users identify that any of these issues may affect road safety, they may contact through the numbers described and, following a national internal communication protocol, TMCs are notified of the incident in question.

At present, new systems that allow this type of incident to be detected automatically (animals through infrared sensors & cameras, IDS -intrusion detection systems-, etc) are also being tested. Depending on the type of incident to be detected, the way of sending the information differs, however the final receiver of this type of information, for the moment, is always the TMC. It will be from the TMC where the information will be verified and published so that users are aware of the situation in the shortest possible time.

In addition, in March 2021, National regulation introduced the use of the V-16, a connected beacon device for drivers that will replace the traditional emergency triangle and the obligation

for towing services to report their location. The emergency triangles will be removed due to the high number of fatal crashes that occurred when drivers get out of their vehicles to place or pick them up after having suffered a mishap on the road and will be replaced by a device that incorporates a geolocation system which, once activated, sends the location of the stopped vehicle every 100 seconds to the DGT 3.0 cloud, so that this information reaches other drivers. The device is a luminous beacon that emits a flashing orange light. The detailed description of the operation of this innovative device connected to the DGT 3.0 cloud can be consulted through the following link.

Finally, in relation to this type of information, the DGT has also developed a use case associated with tow trucks in operation (repair or removal) on the road by means of dynamic geopositioning of the vehicle and the states during the operation itself, which it communicates to the DGT 3.0 cloud so it can be published in the national access point for traffic and mobility. In this way, drivers are warned with the necessary anticipation to adopt driving measures that minimise the risk when passing through the vehicle's rescue area (lateral separation, speed reduction, etc.). Details of this use case can be found here.

2.1.5.1.1.3 Accident area

Nowadays, most of the accident-related information is obtained through cameras, police reports, 112 emergency services and also some service providers feed the NAP with events related to accident breakdowns.

Similarly, the eCall service is also in operation in Spain. For the time being, these incidents are being received by the 112 services, of which, specifically those of the Comunidad Valenciana and Galicia, are sending the information to the NAP and complementing the information collected by the means indicated in the previous paragraph.

2.1.5.1.1.4 Short-term road works

It is essential in terms of road safety that the data are accurate and reliable. The road works service provides centralised access to information on the impact on the road caused by these works, which in the authorisation and planning process have been registered at the DGT through the TRAZA application. In the execution phase, the information on the planned works is updated in real time through the RENO information system developed by the DGT. Maintenance or construction companies must use this app to communicate the scheduled road works, the area affected (kilometres, lanes, shoulders, etc.), the beginning and the ending of the work, including the geographical location. This information is automatically uploaded to NAP (update frequency 2 minutes) through DGT 3.0.

Furthermore, as mentioned in the introduction of the document, on October 21st of 2022, a resolution was published defining the protocol and format for sending data to the NAP on the location of road sections where workers are working through the use of connected cones. These devices will allow the reception and publication of information related to the exact location of the workers in charge of road maintenance works. Specifically, the service is responsible for receiving the signal coming from the cones deployed on the road, which will be directly connected to the DGT. In addition, there will also be situations in which a work or damage on the road must be signalled, even if no worker is in the area. In these cases, the connected cones will be useful in order to alert drivers approaching that point, thus avoiding accidents that may arise from such work or damage.

This service is voluntary for the moment, however, it will reduce the burden on maintenance or construction companies to report the exact location of their workers, while reducing the time in which these coordinates are available in the NAP and increasing the visibility of the section by means of a beaconing system.

All information generated through this service will be disseminated to third parties free of charge through the NAP.

More information on these devices can be found through the following link

Other solutions like Personal Protective Equipment (PPE) fitted with geolocation equipment has been incorporated into Spanish road works, enabling road operators to act safely. They are also capable of alerting drivers of their presence on the road. This initiative is currently under assessment.

2.1.5.1.1.5 Reduced visibility

The phenomenon of reduced visibility is critical for road safety. In specific locations where this phenomenon is a recurrent situation, some ITS have been deployed. These ITS can identify reduced visibility so that TMC can decide to close the affected lanes, divert the traffic flow and forecast the duration of the episode. All these dynamic road statuses are uploaded to the NAP.

DGT is working very closely with AEMET to integrate at the Mobility Map the information related to reduced visibility forecast due the fog, heavy rain, winds, etc.

In areas of recurrent heavy fog, the DGT installed in 2018 on the A-8 (Alto de O Fiouco) highway a "smart" beacon system pioneer in Europe that seeks to help the driver to drive in situations of dense fog with visibility between 30 and 40 meters. This system ensures that drivers can drive safely in such dense fog.

The system consists of distributing pairs of specific luminous beacons (one in the median and the other on the edge), placed every 50 meters along the road, dividing it into cantons, in the style of railway signalling.

The beacons have a fixed amber light that guides the driver permanently and another red light that is only activated when a vehicle is detected passing. Vehicles, as they move forward, will find red lights on when within the next 50 meters there is a vehicle driving in front of it. The beacons try to anticipate the driver's perception of the rear fog light of the vehicle in front. A more detailed and graphic description of this system can be found at the following link.

Also, when the visibility distance is extremely reduced, the operation of cutting and diverting traffic entailed serious dangers for the personnel carrying it out on site. Therefore, a system was developed, thanks to which it is now possible to carry out the detour automatically, without the intervention of on-site personnel, all managed from the DGT Traffic Management Center in A Coruña, with objective criteria when fog is detected that reduces visibility to 40 meters.

Analogous to other types of information, the DGT is currently working on getting this information through other sources; mainly, floating car data in the context of the Data for Road Safety Multi Party Agreement.

2.1.5.1.1.6 Wrong-way driver

This event is extremely dangerous and DGT is really concern about this situation. Therefore, some pilots have been carried out using video cameras, loops or access control in order to identify a wrong-way driver. Unfortunately, none of them worked without failure, so they are used as conditional warnings.

When the detectors send an alarm of incident, this is validated in the TMC and afterwards uploaded to NAP.

DGT is also analysing other alternatives, bearing in mind solutions with geo positioning by GPS. One of these solutions is based in the collaboration with a service provider to receive notifications if a user identifies a wrong-way driver.

2.1.5.1.1.7 Unmanaged blockage of a road

This situation can be controlled by cameras and police reporting. The responsible for reporting these incidents are the TMC with their systems. These reports include situations where an unexpected roadblock occurs. In addition, other users and Service Providers can report about these events via NAP.

2.1.5.1.1.8 Exceptional weather conditions

Same as for the case of reduced visibility, the forecast related information of exceptional weather conditions is available to service providers through the NAP. Currently, DGT is working on getting this information through other sources; mainly, floating car data in the context of the Data for Road Safety Multi Party Agreement.

2.1.5.1.2 QUALITY CRITERIA

DGT is actively participating in the NAPCORE project. NAPCORE has been launched as a coordination mechanism to improve the interoperability of NAPs as the “backbone” of European mobility data exchange.

As part of this project, working groups 2 "Interoperability and level of service of NAPs" and 3 "NAP content and accessibility" address issues such as the quality criteria to be taken into consideration in relation to shared information.

Although it is not a completely standardised topic at the moment, it does start from an important basis resulting from the work carried out in the EU EIP project, specifically in the sub-activity 4.1 corresponding to "Determining Quality of European ITS Services" -in which DGT also participated-, group which has developed the "Framework Guidelines for Data and Service Quality Requirements". This document provides service quality requirements both for real-time traffic information and for road safety related traffic information.

At this stage, DGT has not yet defined specific quality objectives, but they will be set according to the instructions that are being adopted in the NAPCORE project.

2.1.5.2 Results of the assessment of compliance with the requirements set out in Articles 3 to 8

2.2.1 ARTICLE 3: LIST OF ROAD SAFETY-RELATED EVENTS OR CONDITIONS

Data categories (as defined in the Annex of the Delegated Regulation 886/2013) covered by the Safety Related Traffic Information at a national level are specified in the next Table:

Table 58. Data categories covered at the national level in relation to SRTI. Source: DGT

DATA CATEGORY	COVERED X=YES (X)=PARTIALLY N/A=NOT AVAILABLE
Safety related traffic events and conditions	
a) Temporary slippery road	X
b) Animal, people, obstacles, debris on the road	X
c) Unprotected accident area	X
d) Short – term road works	X
e) Reduced visibility	X
f) Wrong way driver	X
g) Unmanaged blockage of a road	X
h) Exceptional weather conditions	X

2.1.5.2.1 ARTICLE 4: INFORMATION CONTENT

To inform the user of an event or incident detected on the road, it is considered of utmost importance (and this is how it is currently done through the NAP) to provide the:

- Location of the event, provided through the code of the road and its KP or range of KPs
- The category of the event. The most commonly used classification at the national level is: congestions, roadworks, meteorology, events and others.
- Warning to the driver: Brief description of what the incident is, to take appropriate actions behind the wheel.
  Information provided through NAP follows DATEX II format specifications.

When an incident takes place, TMCs report and continuously update on the status of traffic in relation to the incident.

2.1.5.2.2 ARTÍCULO 5: PRESTACIÓN DEL SERVICIO DE INFORMACIÓN

The minimum universal safety-related traffic information services are provided both throughout the TEN-T Network and along the road network listed in **¡Error! No se encuentra el origen de la referencia.**.

2.1.5.2.3 ARTICLE 6: DETECTION OF EVENTS OR CONDITIONS AND COLLECTION OF DATA

Means and equipment are being used for the detection of events or particular conditions on the road that could lead to any type of alteration in road safety. In particular, along this report it has been explained how the minimum safety information is collected at a national level.

2.1.5.2.4 ARTICLE 7: AVAILABILITY, EXCHANGE AND RE-USE OF DATA

Spain provides the information using different systems and applications taking into account the list of road safety-related events or conditions which are described at the Commission Delegated Regulation (EU) Nº 886/2013. This information is available at the NAP using DATEX II to allow the interchange of data.

The NAP is a neutral hub and digital point of access in which the different administrative bodies and service providers that operate in Spain, with their particular sources of information (Traffic Management Centres, dedicated Apps, Traffic police reporting, 011 reporting -Spanish traffic information and road assistance phone-, scheduled road works, Scheduled sport events, …) regularly upload relevant events and updates in order to provide real time traffic and road safety-related minimum universal traffic information like for example:

- Traffic regulations identifying dangers (Access conditions)
- Speed limits
- Traffic circulation plans
- Road closures
- Lane closures
- Roadworks
- Accidents and incidents
- Direction of travel on reversible lanes
- Temporary traffic management measures
- Travel times

As aforementioned, these data are collected, formatted, and made available through the “NAP” for exchange and reuse.

Service providers can consult traffic conditions (http://nap.dgt.es) provided by nine different organisations:

- DGT - General Directorate for Traffic
- DT-GV - Traffic Department - Basque Country
- SCT - Servei Català de Trànsit
- DGC MITMA - General Directorate for Roads – Ministry of Transport and Sustainable Mobility
- Madrid City Council
- 112 Galicia
- 112 Comunidad Valenciana
- TomTom
- IMA Ibérica - headquarters for Spain and Portugal of the Inter Mutuelles Assistance Group for the provision of roadside assistance
- Here

All the information published through the different applications described and through the national access point are open data that can be reused by any person or entity.

And finally, it can be stated that information updates are being carried out precisely and regularly and that there is a procedure for the revision of the information to be published so that its quality is optimal.

2.1.5.2.5 ARTICLE 8: DISSEMINATION OF INFORMATION

At the level of the Spanish government, road safety is a priority over other types of traffic-related information. This is why it is considered important, when providing information, to take into account the category of data to be shared, in order to ensure, above all, the safety of users.

All the information related to road safety is transmitted through the different applications described throughout the document and through the NAP.

2.1.5.3 Description of changes from previous reports

Although previous reports on Commission Delegated Regulation (EU) No 886/2013 already describe tools and applications developed in Spain to comply with this regulation and provide this service in all the roads of the TEN-T network and other, this report mainly focuses in how Spain has been working in improving the sources and procedures to improve the quality of Road safety-related minimum universal traffic information.

Main breakthroughs during this period have been the following:

- The amendment of RD 159/2021, which regulates roadside assistance services in Spain, is currently being processed and will complete all the administrative procedures so that connected V-16, connected beacon devices for drivers that will replace the traditional emergency triangles, can be used.
- A resolution has recently been published defining the protocol and format for sending data to the NAP on the location of road sections where operators work using connected cones.
- Spain is also participating in the Safety Related Traffic Information (SRTI) Ecosystem created by the Data for Road Safety Multi Party Agreement for the exchange of data and information under the terms and conditions of the Agreement and thus creating a trust domain for that exchange.
- New service providers joined the NAP (ie. Here).

Illustration 48: Señal luminosa V16. Fuente: Revista DGT

2.2 Priority Area II. Continuity of traffic and freight management ITS services

The aim of the projects and activities described in this priority area is to improve traffic continuity and the competitiveness and safety of road freight transport.

Illustration 49: Goods transport

2.2.1 Description of national activities and projects

The ITS Directive provides that specifications and standards for the continuity and interoperability of traffic and freight management in services should include:

- The definition of the measures necessary for the development of the ITS framework architecture of the European Union.
- The definition of the minimum requirements necessary for the continuity of ITS services
- The definition of the minimum requirements necessary to guarantee the continuity of the ITS services for freight management in the transport corridors and in the different modes of transport.
- The definition of the necessary measures for the design of ITS applications.
- The definition of the necessary interfaces to ensure interoperability and compatibility between the ITS urban architecture and the European ITS architecture.

The activities and initiatives associated with these themes are shown below:

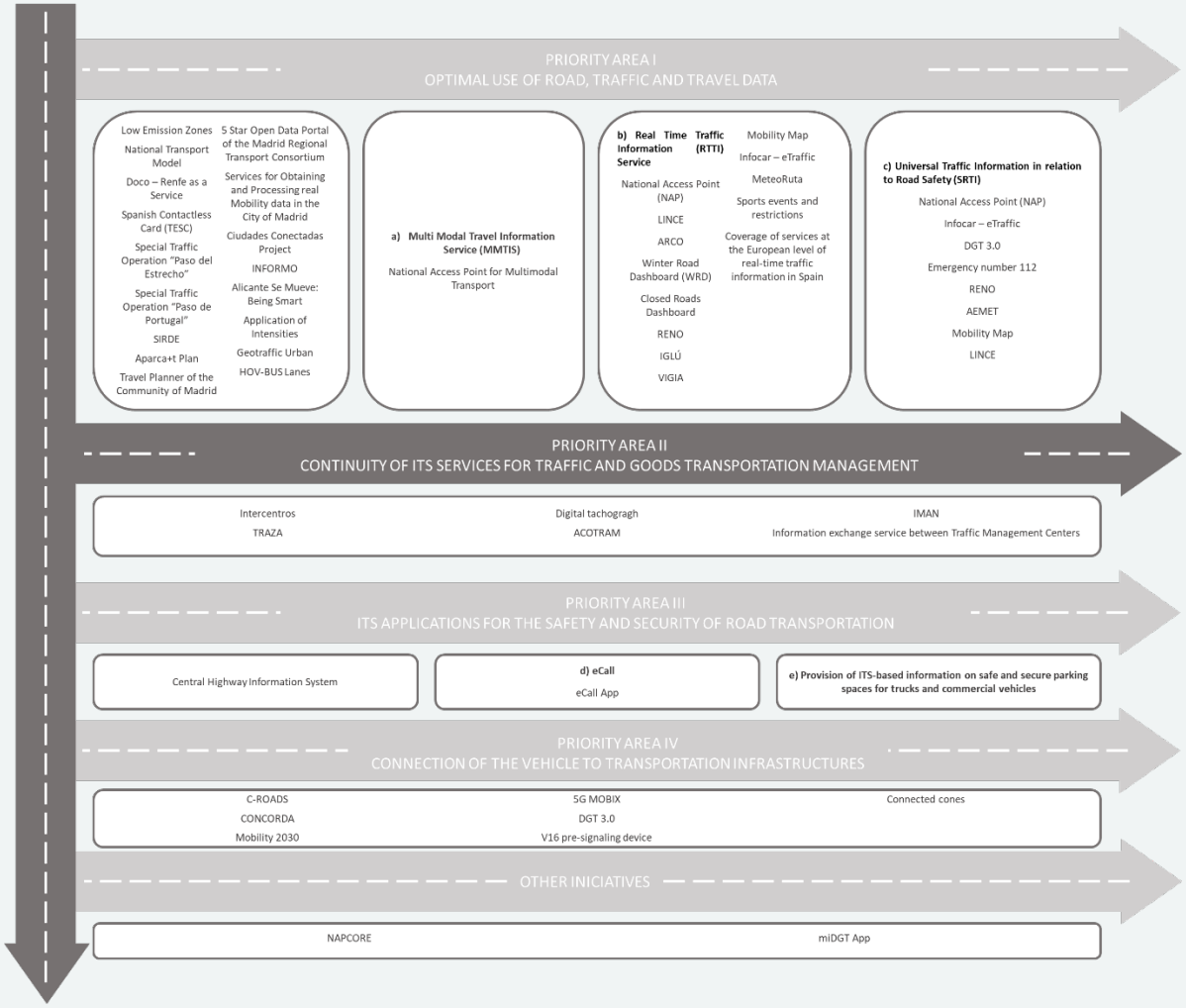


Illustration 50. Priority Area II. Projects, activities and initiatives. Source: Own Elaboration

2.2.2 2.2.2 Continuity of ITS services for traffic management

2.2.2.1 Traffic Management Centers

The Traffic Management Centres (TMC) are the "eyes" of the General Directorate for Traffic. Currently, there are eight centers covering the national territory (with the exception of Catalonia, the Basque country and Navarra, whose competences have been transferred). The TMC are those listed below:

- TMC Centre Area, whose headquarters are located in Madrid
- TMC Northwest, based in A Coruña
- TMC North, based in Valladolid
- TMC Pyrenees - Ebro Valley, based in Zaragoza
- TMC Levante, based in Valencia
- TMC Southeast, based in Malaga
- TMC Southwest, based in Seville
- TMC Baleares, based in Palma de Mallorca

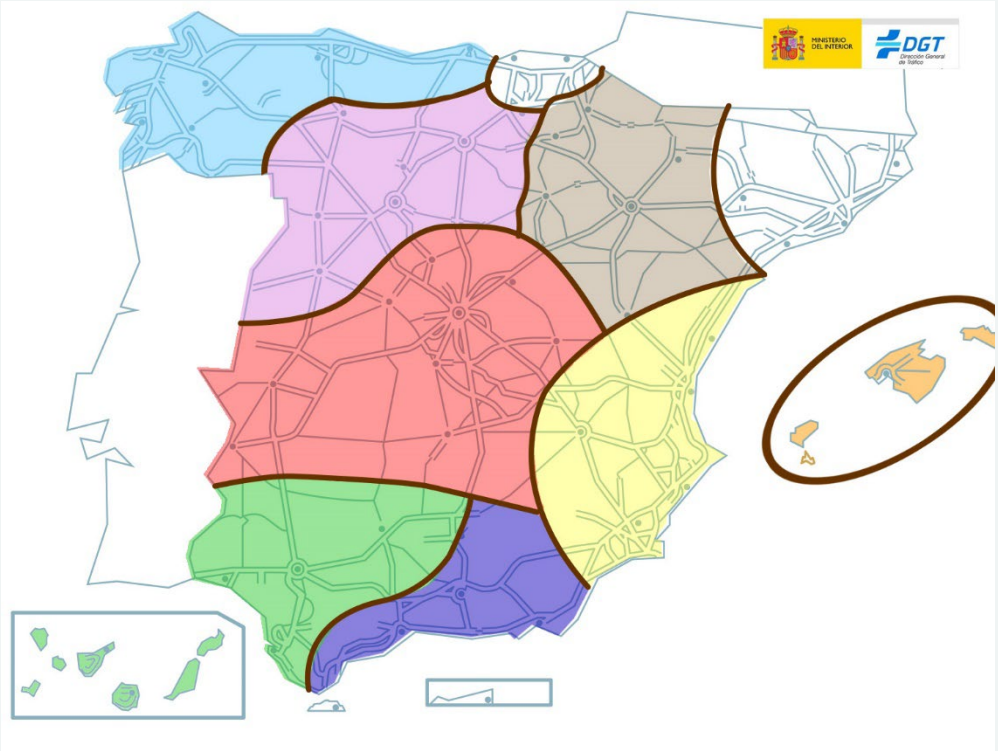


Illustration 51. Management Centres of the Directorate General of Traffic. Source: DGT

Each center has a defined area of influence and its own technical and human resources. In total, the eight centers have 804 people, 1,702 cameras, 2,035 data collection stations, 441 meteorological stations and 2,407 variable message panels that work to make traffic fluid and safe.

The main functions of the TMCs are:

- Traffic management and control
- Improving road safety
- Providing information and assistance to users when incidents occur
- Promoting research

Illustration 52. Traffic Management Centre in Madrid. Source: DGT

In order to perform these functions in a precise manner, the TMC continuously receive traffic information from various sources: data collection stations that measure traffic parameters at the roadside, atmospheric sensors, helicopters, drones, surveillance cameras, license plate recognition cameras, digital platforms, etc.

As mentioned above, traffic competences in Catalonia, the Basque country and Navarra have been transferred.

The manager of traffic and road safety in Catalonia is the Servei Català de Trànsit (SCT), which was created in 1997 when the Government of Catalonia took over the competences of traffic and circulation of motor vehicles.

Illustration 53. Servei Català de Trànsit logo. Source: SCT

A total of 295 people work in the SCT as a whole, carrying out the different functions of the entity. The SCT is organised through the Central Services and four territorial services (STT): Barcelona, Girona, Lleida and Tarragona. With the main objective of reducing the number of accidents on the road network in Catalonia, the SCT carries out the following functions:

- Traffic
- Education and training
- Communication
- Road Safety
- Legislation
- Others

With the aim of informing users of the status of traffic, properly managing the conflicting sections of the Catalonian road network and improving road safety in Catalonia, the SCT has the Catalonia Road Information Centre (CIVICAT). To do this, it has the support of the air resources available from the SCT and with camera devices, necessarysign posts, vehicle counting, among other equipment. Lauched in 2000, the control center was totally remodelled in 2017 and has incorporated the latest technological innovations to provide a better service to citizens. In addition, in recent years, new management software has been implemented in this center for all systems, which improves, among other things:

- The existing functionalities of camera management, panel signalling, travel time calculations and scenarios representation in the control room videowall.
- The management of roads with dynamic variable speed or with speed plans.
- The automatic generation of reports, support for the monitoring of incident protocols, inclusion of a GIS map for the location and selection of equipment to be operated, generation of traffic alerts and semi-automatic signalling of variable message signs, programming of events, works, sports events, etc.

On the other hand, the body in charge of developing and managing road safety policies in the Basque country is the Basque Traffic Directorate (DT).

Illustration 54. Basque Traffic Authority logo. Security Department. Source: Trafikoa

There are numerous functions within the competence of the DT, among which the following stand out:

- Management and control of interurban traffic
- Planning, directing and coordinating actions to improve road safety and fluidity on interurban roads
- Carrying out studies and researches in the field of traffic and road safety
- Informing users about the state of traffic on public roads
- Developing action programmes and information campaigns on education, training and road safety
- Preparing reports and analysis of traffic accidents

Since July 1, 2023, traffic and road safety responsibilities were assumed by the Foral Community of Navarra. There will be a transitional period of four years to complete the entire transfer, a period that began in April 2023. The transfer implies that the Provincial Police will be the only one that carries out surveillance and control functions of the roads of the Provincial Community, working today shared with the Civil Guard.

Illustration 55. Traffic and Road Safety of Navarra. Source: Carreteras de Navarra

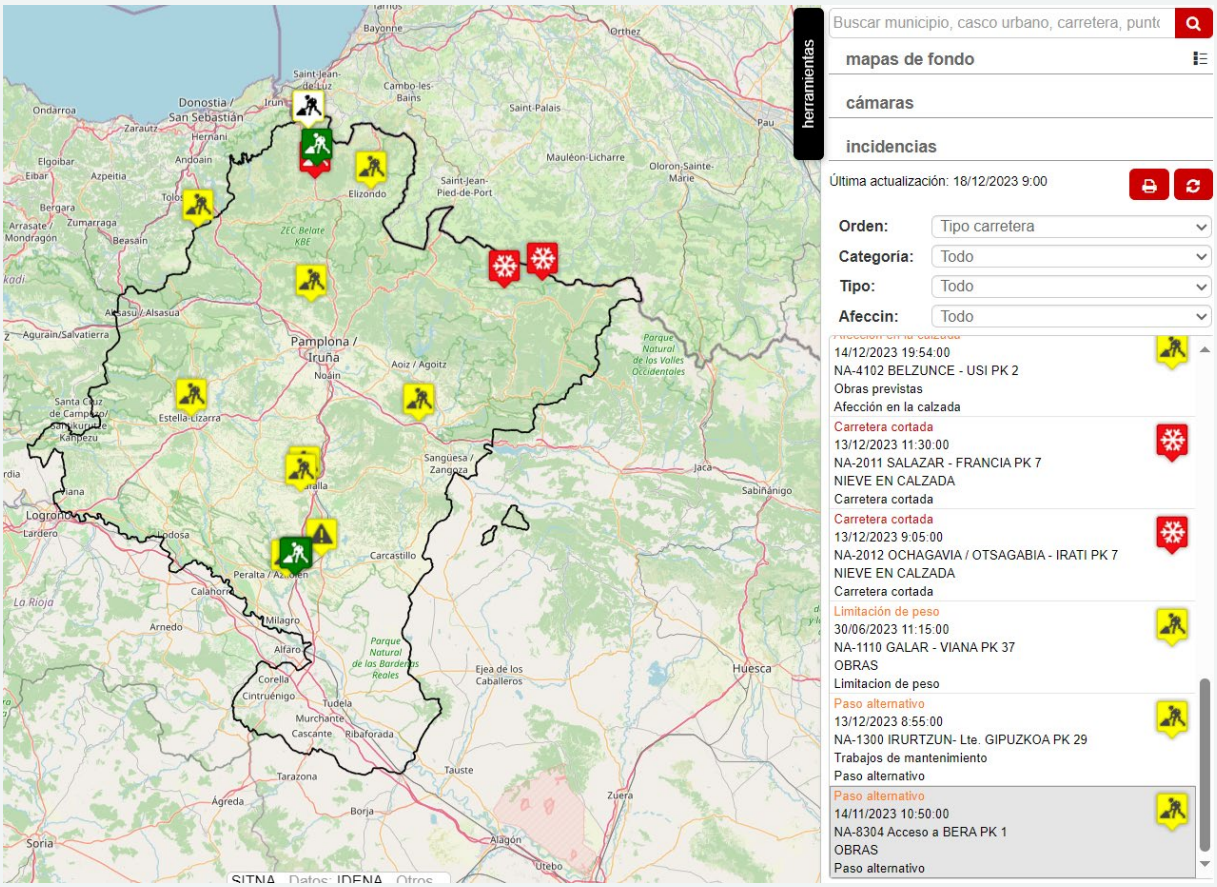


Illustration 56. Map of active incidents. Source: [Carreteras de Navarra]

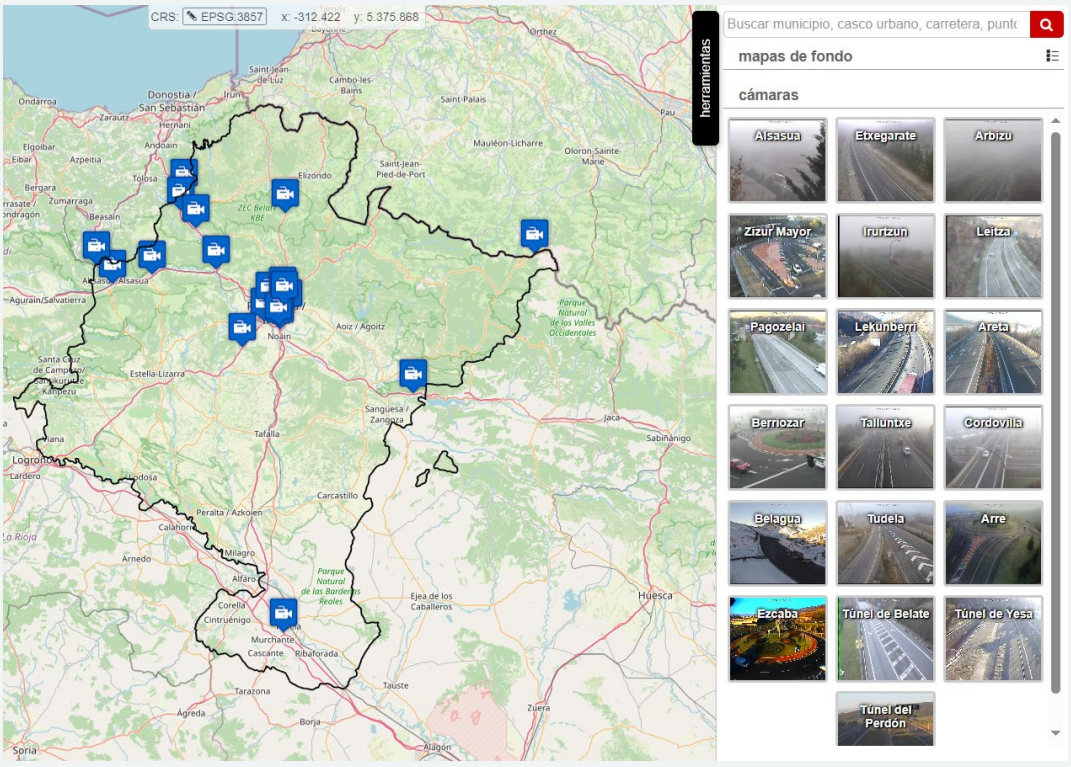


Illustration 57. Map of available cameras. Source: [Carreteras de Navarra]

The four organizations (DGT, SCT, DT and the Foral Community of Navarra) work in a coordinated manner to guarantee the best service to users, regardless of the road they travel on.

2.2.2.2 Intercentros

The DGT is divided into a series of Traffic Management Centers that manage the different areas of the country and are in charge of operating all the ITS equipment. In order to maintain in a single database, the information that each of the TMC collects from the ITS equipment, the UNE standard of “Intercentros” was created.

This standard defines the model and the way of updating information that exists for each of the ITS equipment. This facilitates the publication of data on the Internet that is made available to third parties, as well as on the DGT's own website.

This standard was renewed in 2018 and is in the implementation phase, as it has had to undergo subsequent modifications.

2.2.3 Continuity of ITS services for freight management

2.2.3.1 TRAZA

TRAZA is an application developed by the Ministry of the Interior for the telematic management of authorisations for the transport of goods which require additional authorisation to be able to travel through the national road network and for the management of requests for lane/road closure due to road works.

This system speeds up the administrative process and the communication of these trips to the traffic authorities in case an escort is required or is mandatory by law. In addition, it is possible to track the position of special vehicle fleets (large and over-mass).

2.2.3.2 Digital tachograph

In accordance with European regulations, the implementation in Spain of the digital tachograph for newly registered vehicles, which we are obliged to use and therefore the installation of this recording equipment, began in January 2006 and its inclusion in older vehicles has been encouraged.

The analogue tachograph discs were replaced by smart cards which, thanks to a chip, store driving information and give access to certain functions according to the user profile (driver, company, control body or workshop). The stored information is the same in terms of times and speeds as it was in the analogue tachographs, but it is virtually impossible to manipulate.

Illustration 58: Digital tachograph. Source: Ministry of Transport and Sustainable Mobility

The device is installed inside the driver's cabin so that the driver can see it. The device communicates, by means of a cable, with a sensor installed in the gearbox generally. The installation is sealed so that it cannot be replaced by unauthorized people.

The next version of smart tachograph V.2 will be implemented in the coming years in accordance with the provisions of Regulation (EU) No. 1054/2020.

On the website of the Ministry of Transport, Mobility and Urban Agenda there is a simulator that offers the possibility of practicing with the new digital tachographs on the market. The tool consists of an interactive simulator and guided learning sequences specific to each manufacturer.

This simulation can be carried out either by downloading the application directly onto the computer and doing the simulation off-line, or it is possible to run the simulation on-line.

2.2.3.3 ACOTRAM

ACOTRAM (Assistant for the Calculation of Road Freight Transport Costs) is an application to assist in the calculation of operating costs for road freight vehicles.

Thanks to this application, it is possible to consult the direct costs of the different types of vehicles studied in the "Observatory of Road Freight Transport Costs" whose data are updated every three months.

Downloading the application, as well as downloading the Observatory data, can be done through the website of the Ministry of Transport, Mobility and Urban Agenda.

2.2.4 Progress since 2020

2.2.4.1 IMAN

The DGT has ITS equipment deployed throughout much of the country, so it is necessary to have an inventory application, IMAN, which is responsible for having all the information of these equipment updated.

IMAN allows the DGT to fill in all the characteristics of the heterogeneous equipment that exists, with special emphasis on the location of the equipment that serves to display it on the DGT's website.

The application allows the storage of: connections, mobile counters, radar cabins, vandal proof cameras, video surveillance cameras, cymometers, medium speed cymometers, beacon controllers, CVT, double detectors, simple detectors, data collection stations, meteorological stations, universal remote stations, area communication nodes, variable message signs, SOS posts, sections, license plate recognition sections, traffic lights, non-intrusive sensors for vehicle counting, capture and lighting units, control units and areas.

It should be noted that this application is also used to control the publication of this equipment on the Internet, allowing the equipment to be marked as non-publishable during the installation and maintenance phase or when the equipment is malfunctioning.

2.2.4.2 *Information Exchange Services between Traffic Control Centers*

The General Directorate of Traffic is developing the implementation of a process control system architecture for the Traffic Management Centers and a video streaming system with access to third parties, deployed under Infrastructure as a Service (IaaS/PaaS) on modality of cloud computing and the incorporation of additional functionalities of the General Subdirectorate of Mobility and Technology Management that allow the construction of a functional work ecosystem for the Traffic Management Centers and the entire Subdirectorate appropriate to the functional and technological needs.

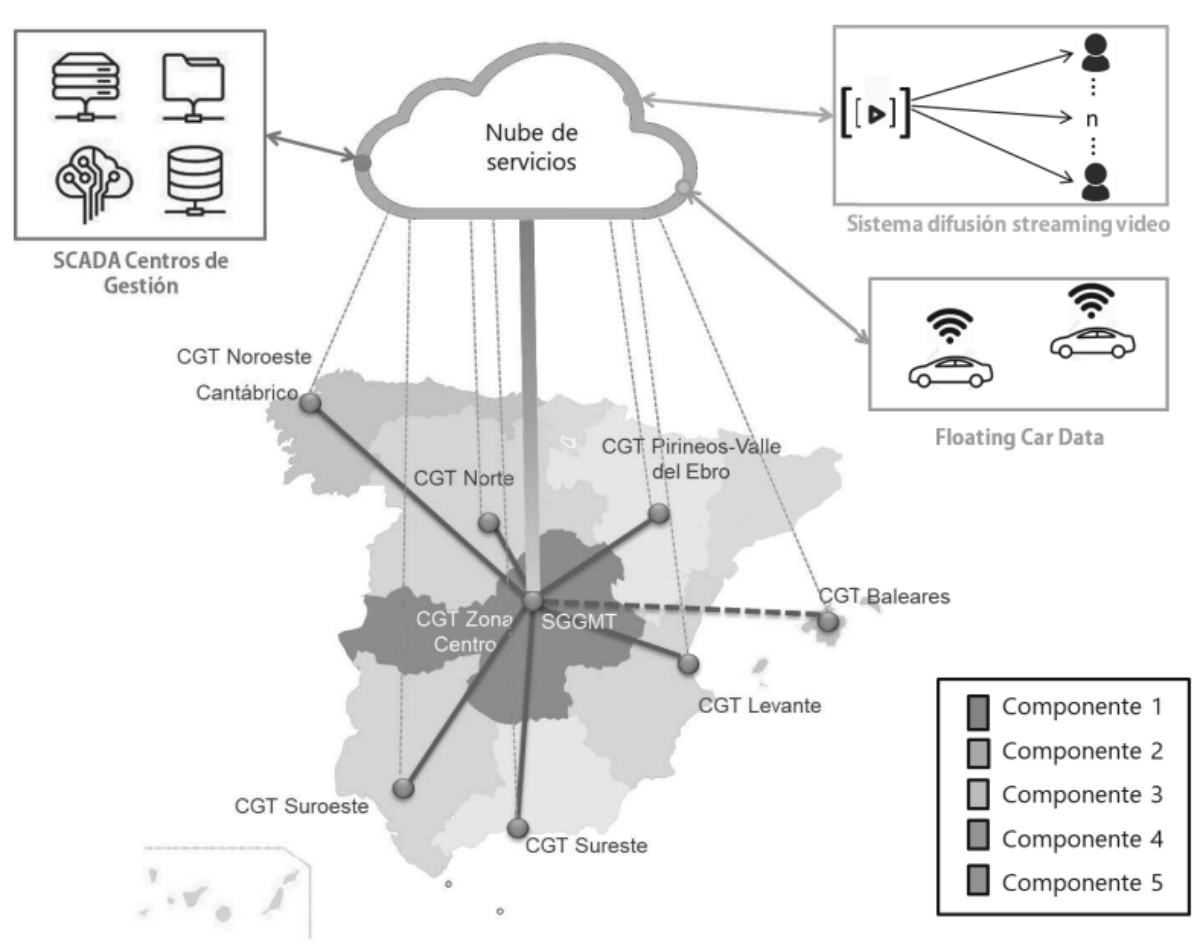


Illustration 59. Representation of requirements. Source: DGT

The System is expected to be fully implemented in 2027.

2.3 Priority Area III. ITS applications for road transport safety and security

Advances in the field of road safety in Spain have made it possible to reduce the number of fatalities in traffic accidents by 1% compared to 2019, registering 37 road deaths per million inhabitants in 2022, while the average European Union was 46 deaths per million inhabitants in that same year.

Illustration 60: One victim is too many. Source: MAPFRE Foundation

However, Spain continues working, looking for solutions and innovating to achieve the goal of zero deaths in traffic accidents.

In this framework, ITS play a key role and, therefore, Spain is committed to the deployment of these systems that, without a doubt, will continue to facilitate safe travel for citizens.

2.3.1 Description of national activities and projects

This priority area focuses on the description of specifications and standards for ITS applications on safety and security in road transport. The following priority actions are part of this area:

- Priority action (d): Definition of the measures necessary for the harmonized provision of an interoperable EU-wide emergency call number (eCall)
- Priority action (e): Definition of the necessary measures for the provision of ITS-based information services on safe and secure parking places for trucks and commercial vehicles, in particular at rest areas on the road network.

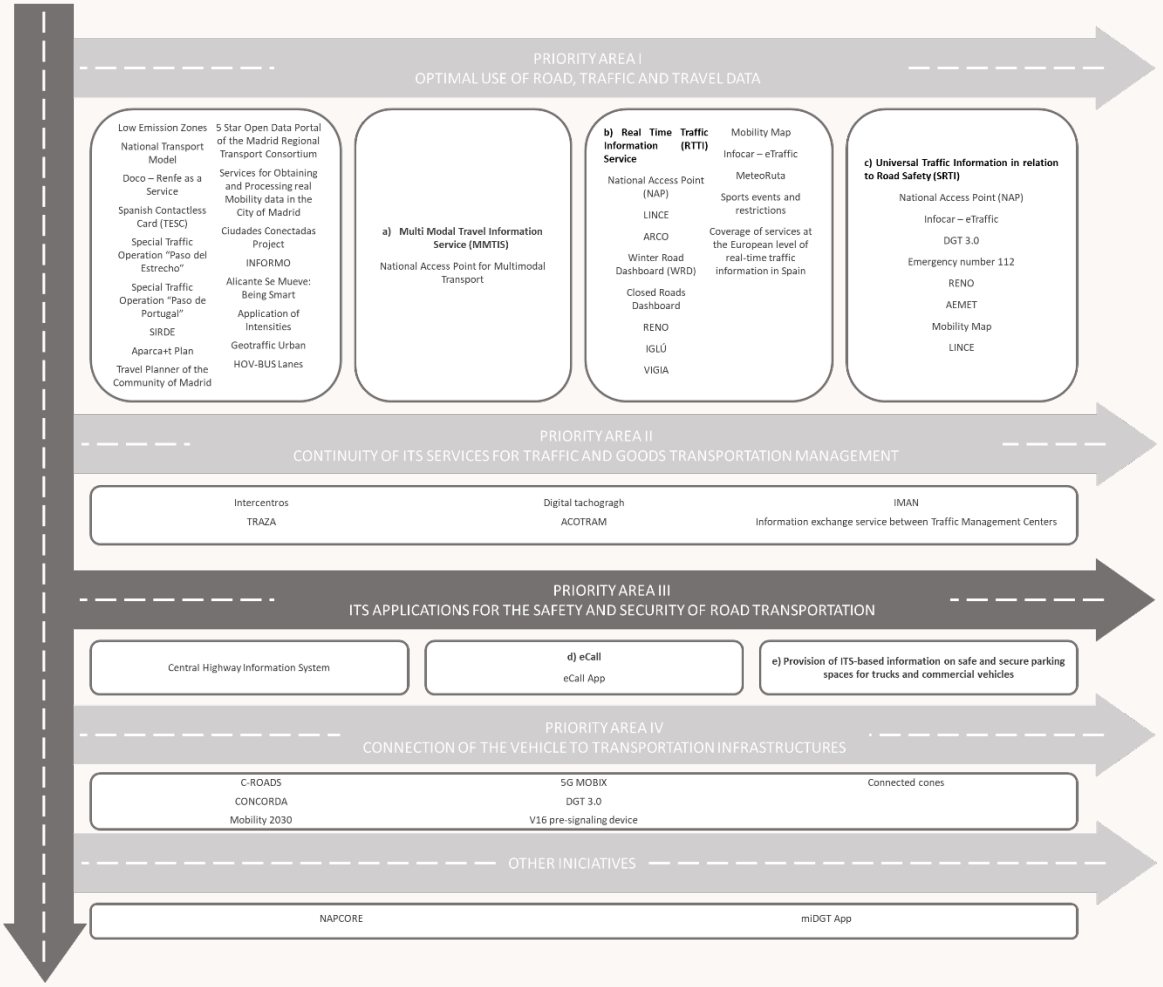


Illustration 61. Área prioritaria III. Fuente: Elaboración propia

2.3.2 Progress since 2020

2.3.2.1 Central Highway Information System

The Central Road Information System (CRIS) is a traffic information platform that can be integrated into road management systems, developed by Indra together with Cintra. The CRIS platform automatically recommends information suitable for sharing with offline connected and traditional vehicles to operators in real time through variable messaging panels. It is a cloud solution that is applicable to multiple highways thanks to its flexibility and the use of artificial intelligence and edge computing. The system integrates data from all types of sensors, from traditional radars and traffic meters to advanced 3D LIDAR sensors and connected vehicles that, in turn, will also act as sensors to identify the state of the road.

The platform's real-time data processing capacity is extremely high. It also uses Cellular Vehicle-to-Everything (C-V2X), the latest and most secure communications standard, and has advanced design-based cybersecurity capabilities backed by certifications that are updated weekly to ensure data integrity and prevent confusing or false information being sent to connected vehicles.

CRIS initially includes nine easily configurable and expandable services that can be adjusted according to needs: road works warnings, road incidents, approach of emergency vehicles, detection of oncoming vehicles, vehicles stopped on the road, reversing and slow traffic,

pedestrians on the road, close circulation of maintenance vehicles and adverse weather conditions.

2.3.3 112 eCall (priority action d)

For Spain, the harmonized provision of an interoperable eCall service across the EU is a priority action since it shares the vision that this service would contribute to the reduction of the number of fatalities in the European Union, as well as the severity of injuries caused by road accidents by reducing the response time of the emergency services.

In relation to the current state of deployment, the nineteen (19) 112 autonomous PSAPs (Public Safety Answering Points) meet the requirements of the eCall PSAPs included in the Delegated Regulation (EU) No 305/2013 of 26 November 2012 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonized provision of an emergency call number throughout the European Union, subject to compliance by the other entities concerned (mobile network operators, car manufacturers, ...).

The 112 autonomous PSAPs are committed to carry out a self-assessment of compliance operations, in the same way as they currently work with E112 calls.

The eCall PSAPs have been deployed in the seventeen (17) autonomous communities.

All the infrastructure of these PSAPs is being updated to allow the correct reception and handling of eCalls (automatic and manual) using the number 112.

The geographical coverage of each PSAP eCall includes the respective territory of the autonomous community or city.

The description of the compliance tests has been defined based on the part of the Intelligent Transport Systems Standard - eSafety - eCall End-to-End Compliance Test (EN 16454) that relates the compliance of the PSAPs to the pan-European eCall.

The eCall procedures in Spain related to privacy and data protection included in the Delegated Regulation 305/2013 article 6 comply with the Spanish Law of Personal Data Protection (LOPD) approved on 5 December 2018, in the same way that they currently work with the handling of E112 calls.

In addition, the DGT makes available to the Autonomous Communities and Autonomous Cities a service to report all those incidents related to traffic, including eCalls.

For the time being, these incidents are being received from the 112 in the Valencian community and Galicia, which complete the information that the Guardia Civil Association and the Traffic Management Centres register in the LINCE system.

2.3.3.1 eCall – App

The company “Autopistas”, responsible for the management of toll roads, has an e-Call functionality in its Motorways on the Road app so that, in case a person has an incident, the app geolocates the mobile phone and sends a signal to the Granollers Operations Centre, from where the incident is managed. If the incident occurs outside the motorway limits, the signal is sent to 112.

Illustration 62: Highway Operations and Road Safety Center. Source: Autopistas

2.3.4 2.3.4 Reporting obligation under the Delegated Regulation (EU) No. 885/2013 on the provision of information services concerning safe and secured parking places for trucks and commercial vehicles (Priority Action e)

2.3.4.1 Progress made in the implementation of the information service

In accordance with Commission Delegated Regulation (EU) 885/2013 on the provision of information services on safe and monitored truck parking areas, and Law 37/2015, of September 29, on Highways, in its Articles 26 and 27.5, the Director General of Highways agreed to implement the National Access Point (NAP) to information, currently managed by the Directorate of Planning and Operation of Highways, on the current safe and protected parking spaces in the National Network of Highways. Highways of Spain.

With the approval of Commission Delegated Regulation (EU) 2022/1012 which complements Regulation (EC) No 561/2006 as regards the establishment of standards detailing the level of service and security of parking areas safe and secure areas and the procedures for their certification, a new certification system was implemented by which the owners of the operation of safe and secure truck parking areas would be the ones who would have to request the corresponding accreditation from the official certifying entities, and subsequently communicate it to their respective National Highway Agencies.

This new certification distinguishes between four levels of security (bronze, silver, gold and platinum) and requires minimum levels of service, so the correspondence between both certification systems is not immediate.

These new requirements that certain facilities must meet to be considered “safe and protected parking areas” in terms of service and security are in force since July 28, 2022.

For this reason, the General Directorate of Highways of Spain has established a transitional period of six (6) months (starting from the notification to the owners of the facilities affected by this regulatory change) in which two (2) NAPs will be applied. about safety and security. The parking areas would be managed in parallel: one based on the LABEL certification system and the other with the new certification procedure.

Based on the above and by virtue of various requests from transport associations, even having consumed the aforementioned transitional period, the General Directorate of Highways of Spain has considered it appropriate to allow both NAPs to be displayed but keeping the one based on the Regulation active. Delegate 2022/2012 and leaving the LABEL map as merely informative and frozen in terms of updating, today surpassed by the current system.

2.3.4.1.1 NUMBER OF DIFFERENT PARKING PLACES AND SPACES IN THE SPANISH TERRITORY

All the information regarding safe and secure parking places and spaces in the Spanish territory can be consulted in the national access point to information services for safe and secure truck parking areas:

- National Access to information point on safe and secure parking areas certificated in accordance with Commission Delegated Regulation (EU) 2022/1012.
- National Access to information point on safe and secure parking areas certificated in accordance with the European project Label.

Nowadays, there are:

- **Eight (8) safe and secure parking places certified based on the Delegated Regulation 2022/2012** in the National Road Network of Spain, all of them listed in its NAP (permanently updated). This number is constantly increasing, with new parking areas being set up and added to the national access point. In fact, the last certificate has been issued in October and, precisely, it has been in Spain. It is important to highlight that, even being a small number, it supposes more than the 40 % of safe and secure truck parking areas in the whole EU (total number: 21; 8 are located in Spain).

- **Forty-two (42) safe and secure parking places certified based on the LABEL system** (previous certification system) in the National Road Network of Spain, all of them listed in its NAP (not updated anymore). These parking areas do not meet necessarily the requirements of level of services and security of the recently published Delegated Regulation 2022/2012 but are shared just for information.

These NAP's contain not only the list of parking areas but also the set of characteristics shown below, among others:

- Name of facilities.
- Location.
- Access road.
- Longitude/latitude coordinates.
- Number of parking spaces.
- Parking rates.

- List of main offered services and security levels in the NAP for the current certification system, and the LABEL safety and service levels in the LABEL NAP.
- Available security equipment.
- Available service equipment.
- Phone number.
- Facilities website.

2.3.4.1.2 PERCENTAGE OF PARKING PLACES REGISTERED IN THE INFORMATION SERVICE

All the areas specified in the previous section are registered in the information service. Each area registered in the information service complies with the standards set by national and European regulations and the information provided by the owner is reliable and true.

The owners of facilities that, having been duly certified by an independent certification body, according to the provisions of the Commission Delegated Regulation (EU) 2022/1012 of 7 April 2022, demand the information about their parking areas to be accessible through the above mentioned NAP can request their inclusion in it by fulfilling a form and sending it by email, along with the corresponding certification, to the email: dgc.aparc.seguros@mitma.es.

In the following lines, respectively, the recently updated location map and name list for those parking areas certified as the Delegated Regulation 2022/2012, and the frozen location map and list certified following the overpassed LABEL system are available. More details can be consulted in the information service.

Illustration 63. Map Location for those safe and secure truck parking areas certified based on LABEL system (overpassed by the Delegated Regulation 2022/2012 and just shown with a merely informative purpose). Source: Ministry of Transport and Sustainable Mobility

Illustration 64. Map Location for those safe and secure parking places for trucks and commercial vehicles certified based on the Delegated Regulation 2022/2012. Source: Ministry of Transport and Sustainable Mobility

On the other hand, the application WRD (Winter Road Dashboard) has the singularity to reflect the occupancy rate of emergency parking areas. These areas are intended to store vehicles diverted by cuts on roads affected by severe winter episodes. This information, in addition to providing a clear view of the adverse weather conditions in relation to the road network, makes possible to optimize journeys and decisions in emergency situations.

2.3.4.1.3 PERCENTAGE OF PARKING PLACES PROVIDING DYNAMIC INFORMATION ON THE AVAILABILITY OF PARKING SPACES AND THE PRIORITY ZONES

There are currently companies that allow making reservations from their website by streamlining the service utilization process, such as REPSOL or Mowiz Truck (EYSA).

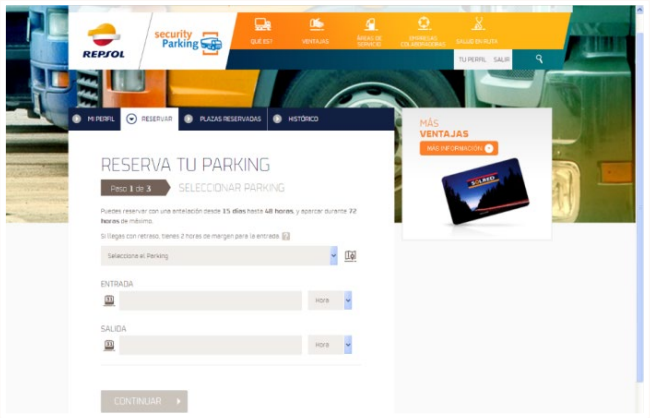


Illustration 65: Reservation web. Source: REPSOL

Other companies provide to the user a list of free places that exist in their service areas. By means of this information user can organize his route in the short term to be able to use this specialized area. This website does not allow reservations but there, user can purchase a card linked to the user bank account that allows to access without waiting for the parking área.

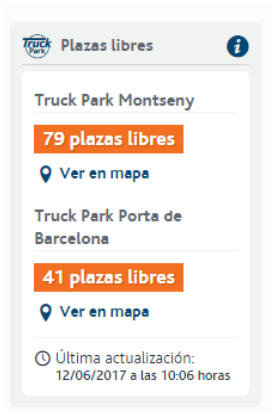


Illustration 66: Information for free places. Source: Autopistas

Some projects in this area were carried out under the framework of the EU LABEL project and are still on-going with the adaptation to the requirements derived from the Delegated Regulation 2022/2012, as REPSOL, but there are also others that have been already certified following the new procedure, as Mowiz Truck.

2.3.4.1.4 QUALITY CRITERIA

Spain has actively participated since 2016 in the European platform EU EIP. Among other activities and sub-activities, it has worked in SA 4.1 Determining Quality of European ITS Services, in which the Intelligent Truck Parking Services (ITPS): Quality Package was developed, which can be consulted at the following link.

Work is currently in progress on these aspects through the European NAPCORE project, which is a continuation of the EU EIP.

2.3.4.2 Results of the assessment of compliance with the requirements set out in articles 3 to 8

2.3.4.2.1 ARTICLE 3: REQUIREMENTS FOR THE PROVISION OF INFORMATION SERVICES

In compliance with the provisions of Article 3 of the Commission Delegated Regulation 885/2013 that contemplates Directive 2010/40/EU of the European Parliament and the Council (ITS Directive), the following areas are designated:

- The environments of the large urban agglomerations: Madrid, Barcelona, Bilbao, Valencia, Zaragoza, Alicante, Sevilla and Malaga that, due to their high traffic volume and consequent need for security, require the deployment of information services on the existing protected and safe parking areas.
- Priority areas, in which the level of occupancy can be alleviated by providing information on the availability of space in other safe and secure parking facilities nearby with parking vacancies. In these priority areas, it will be necessary to provide users with

dynamic information on the state of the car parks (in-service/full/closed) and the availability of free spaces.

2.3.4.2.2 ARTICLE 4: DATA COLLECTION

The inclusion of safe and secure trucks parking areas in the NAP will be done by the General Directorate for Roads, responsible for its management and updating, once the parking area operator / owner requests, attaching with its demand the certification issued by the proper independent certification entity.

2.3.4.2.3 ARTICLE 5: SHARING AND EXCHANGE OF DATA

Data can be accessed through a national or international Access Point for exchange and re-use by any public or private information service provider and/or parking operator on a non-discriminatory basis, and in accordance with access rights and procedures defined in Directive 2003/98/EC.

2.3.4.2.4 ARTICLE 6: DISSEMINATION OF INFORMATION

The Ministry of Transport and Sustainable Mobility (MTMS), through the General Directorate for Roads, collects the data and subsequently makes them available for any interested party through the pertinent NAP.

Information is displayed, within a radius of approximately one hundred kilometres (100 km) of the next two safe and secure truck parking areas.

2.3.4.2.5 ARTICLE 7: QUALITY MANAGEMENT

Any change in the situation of the safe and secure truck parking area, including its closure, shall be communicated to the national or international Access Points and to the National Authorities responsible for its management and update.

2.3.4.2.6 ARTICLE 8: ASSESSMENT OF COMPLIANCE WITH THE REQUIREMENTS

Based on the new procedure described in the Commission Delegated Regulation 2022/2012, an independent certification entity will verify compliance by truck parking areas considered as “safe and secure” with the requirements of the regulation in force. The verification will be done per request of the owner / operator initially and periodically, both through the independent certification entity.

The General Directorate for Roads (DGC), with the collaboration, where appropriate, of the General Directorate for Road Transport, as well as other Administrations or Organizations involved will be responsible for the inclusion of these certified safe and secure truck parking areas in the NAP once it is explicitly requested by the owners / operators. This inclusion will just have place in case an official certification following the prescriptions of the current regulation is attached to the mentioned demand. Nevertheless, the inclusion in the NAP does not imply assumption of any responsibility on the part of the Administration.

2.3.4.3 Description of changes (compared to previous report) to the National Access Point

Significant changes have been with regards to the previous report considering the impact of the new Delegated Regulation 2022/2012 on the certification procedure and, in consequence, the different levels of service and security of the considered safe and secure truck parking areas:

- Currently, verification of compliance with the requirements derived from the new regulation is attributed to independent certification entities. National Road Agencies just plays a role as responsible for updating their respective NAP's, and always upon request of the interested party.
- Two (2) NAP's are nowadays displayed in comparison to the previous report scenario: one alive collecting the safe and secure truck parking areas certified by the new regulation in force; and the previous LABEL system certification map, just shown with a merely informative purpose.
- It should be noted that the number of safe and secure truck parking areas certified through the overpassed LABEL system had increased, going from thirty-eight (38) to forty-two (42) areas.
- In Spain there are eight (8) properly certified safe and secure truck parking areas of the twenty-one (21) in total in UE, representing more than a 38% of the whole number of safe and secure truck parking areas certified by the regulation in force.
- In October, just one (1) new truck parking area obtained the certification as safe and secure, and it has been in Spain. This truck parking has been already updated in the NAP that the DGC manages.

2.4 2.4 Priority Area IV. Linking the vehicle with the transport infrastructure

The vehicle, throughout its history, has incorporated electricity and computing into its infrastructure and has now added a new layer: that of communications. Thanks to this new layer, the driver, in addition to seeing and hearing, receives help through other functions provided by the vehicle's systems. According to the "Digital Society in Spain 2023" report, Spain is a leader in digital connectivity infrastructure in Europe.

2.4.1 Description of national activities and projects

This priority area describes the specifications and standards for linking vehicles to transport infrastructure.

These specifications should include:

- Definition of the measures needed to integrate the different ITS applications into an open in-vehicle platform.
- Definition of the measures needed to advance the development and implementation of cooperative systems (vehicle-to-vehicle, vehicle-to-infrastructure, infrastructure-to-infrastructure).

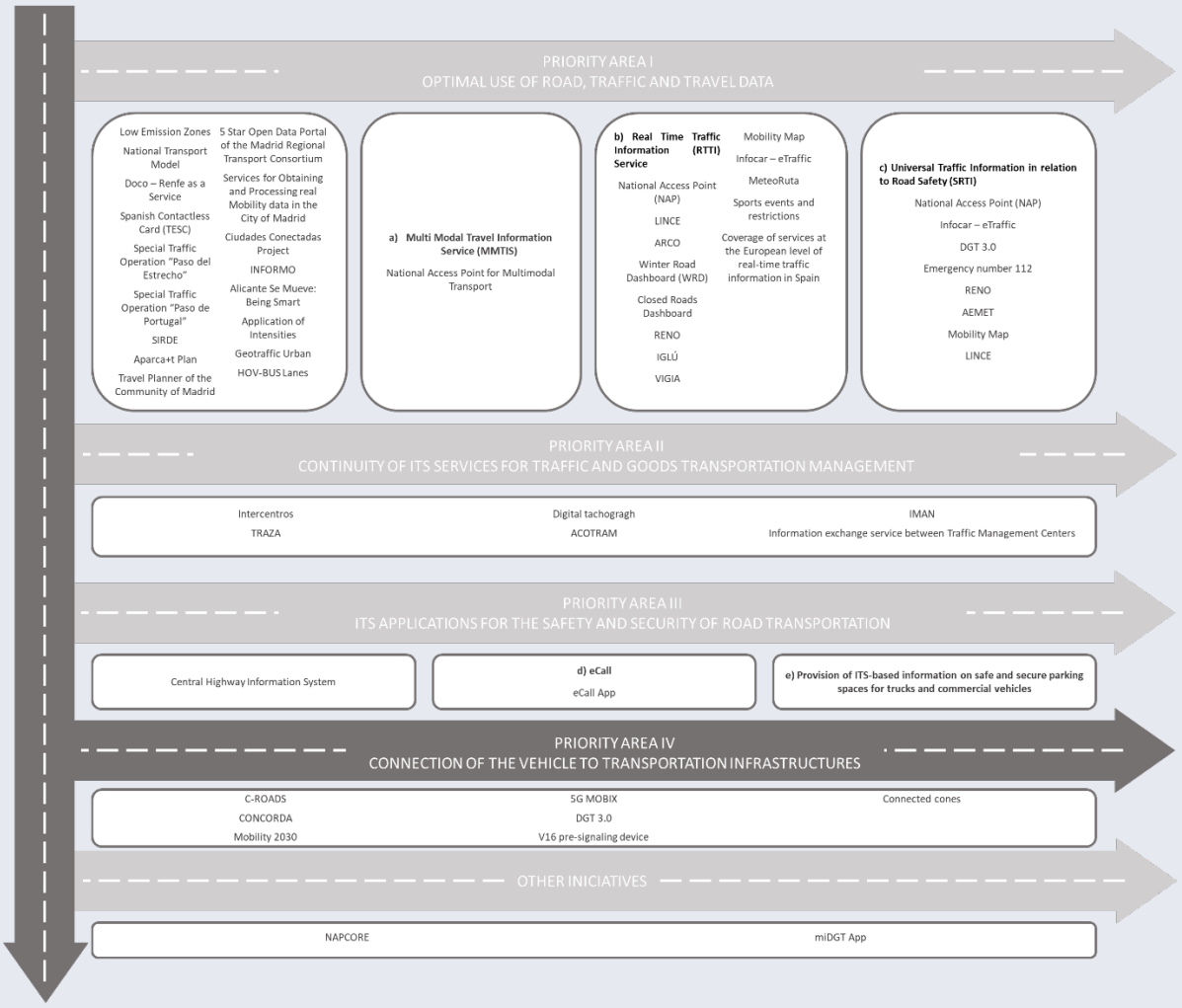


Illustration 67. Priority Area IV. Source: Own Elaboration

2.4.1.1 C-ROADS

The C-Roads platform is an initiative of different Member States and road operators that wish to collaborate to achieve the deployment of harmonized and interoperable C-ITS services throughout Europe. C-Roads is a project co-financed by the European Union under the CEF call 2016-ES-TM-0272-S.

Spain participated in several pilot projects in five (5) local study areas along the TEN-T core network in several Spanish areas (regions of Galicia, Madrid and the Cantabrian and Mediterranean coasts), including part of the TEN-T corridors. T Mediterranean and Atlantic, as well as urban nodes.

The main objectives of the C-Roads platform are:

- Accelerate the deployment of C-ITS in Spain through 5 pilots, prioritizing the full implementation of "Day 1" and "Day 1.5" services.
- To provide a coordinated framework of activity for Spanish stakeholders in the development of C-ITS products and services, in line with European initiatives in this field.
- To participate in the European C-Roads Platform, contributing actively to the different working groups and with presence in the Steering Committee.
- To guarantee the interoperability and continuity of C-ITS services, promoting cooperation with other Member States.
- To study the complementarity of hybrid communications (G5 and cellular communications) for C-ITS.
- To analyse the convergence of technologies related to the connected and automated vehicle.
- To ensure the scalability and replicability of results in order to address a wide deployment of C-ITS in Spain.
- Involve numerous partners covering the entire value chain. Road operators, telecommunication companies, vehicle manufacturers, equipment suppliers, service providers, fleet managers and IT system providers.

In 2021, the final balance of the European C-ROADS project was presented to harmonize the deployment of C-ITS Services (Cooperative Intelligent Transport Services) between member states.

According to the preliminary survey of Spanish stakeholders, the main interests of the C-ITS product owner are based on the perceived usefulness and usability of C-ITS services.

2.4.1.2 CONCORDA

The CONCORDA (CONnected CORridor Driving Automation) project prepared European highways for automated driving and high-density truck platooning with appropriate connected services and technologies.

The main objective of the action was to evaluate the performance of hybrid communication in real traffic situations. The Action elaborated, agreed and potentially validates issues related to hybrid and secure communication, digital infrastructure and positioning accuracy, which require a consensus between sector-specific views. The Action was based on both the EATA (European Alliance Telecommunications for the Automotive Sector), to ensure cooperation

between the telecommunications and automotive industries, such as in the C-Roads platform, in order to guarantee interoperability and harmonization of cooperative ITS services.

Illustration 68. CONCORDA project logo. Source: Amsterdam Practical Trial

This project, launched in 2017, ended in mid-2021.

2.4.2 Progress since 2020

2.4.2.1 Mobility 2030

Mobility 2030 aims to address technologies in the field of smart mobility that allow us to overcome current limitations, contributing to the achievement of the objectives set at a national and international level in sustainable mobility for 2030. The project focuses on 4 main pillars, in in line with future mobility trends and seeking an integrative approach between the different trends:

- Onboard systems for large-scale deployment of automated and connected vehicles (VACs)
- Design of the sustainable mobility model of the future
- Technologies in infrastructure for new mobility
- Regulation, analysis, operation and control for the new mobility

The project tries to evolve and transform transportation towards a new sustainable mobility model based on automation and electrification, capable of responding to the problems previously exposed. To do this, technologies and systems are addressed both in the vehicle and in the infrastructure.

Indra is the coordinator of the project, where it also has great technical weight in the developments carried out in Mobility 2030 and coordinates one of the project activities.

Indra will deploy its In-Mova Space platform for the integration and exploitation of all the transportation data generated in the project. In-Mova Space promotes more sustainable and collaborative mobility and facilitates the development of new business models in the field of smart mobility.

Among the lines of research in which Indra participates are intelligent traffic technology (ITS), which will allow the safe coexistence of connected and non-connected vehicles, as well as cooperative transport systems (C-ITS), which facilitate communication with the connected and autonomous vehicle. C-ITS systems facilitate infrastructure management and vehicle deployment with an advanced degree of automation, seeking levels close to 4, according to the SAE definition. Indra will also develop new traffic state prediction systems, based on deep learning techniques, which also include the connected car itself as an additional source of information.

2.4.2.2 5G-MOBIX

This project develops and tests automatic vehicle functionalities using 5G's core technological innovations along different cross-border corridors and in urban environments.

Illustration 69. Logotipo proyecto 5GMOBIX. Fuente: 5G PPP

The objective of the project is to evaluate benefits in the context of CCAM, as well as to define implementation scenarios and identify and respond to standardization gaps.

Several automated mobility use cases are potential candidates to benefit from 5G, such as cooperative overtaking, merging of road lanes, truck parking, driving in urban environments, detection of road users, vehicle remote control, transparency, HD map updating, media and entertainment.

5G-MOBIX, together with two other European projects (5G-CARMEN and 5G-CroCo) have published a White Paper on “5G Technologies for connected automated mobility in cross-border contexts”. This White Paper describes the valuable conclusions of the three projects on the potential of 5G technology to support connected and automated mobility (CAM) services, especially in cross-border contexts and also in comparison with 4G.

Seamless service continuity in cross-border corridor areas is feasible and can be guaranteed, and the projects tested five different solutions involving the network side and the end device, which were evaluated to assess cross-border service continuity. This research has highlighted the potential of 5G technology to improve cross-border connectivity and the importance of prioritizing handover between RMLTs in this context.

5G was proven to be a capable solution that can significantly improve performance compared to previous technologies, mainly 4G, especially in quantitative terms such as reduced latency, increased capacity and spectral efficiency, but also very important in other qualitative terms such as API exposure such as QoS prediction, which are not available in 4G. As a result, 5G can already support around 80% of connected/automated driving services (including all day 1 services) already today, as its requirements are in line with the performance available on the market.

2.4.2.3 DGT 3.0

DGT 3.0 is the DGT's connected vehicle platform that facilitates the interconnection of all the actors that are part of the mobility ecosystem to offer real-time traffic information to road users at all times, thus enabling greater mobility. safe and intelligent.

Illustration 70. Project DGT 3.0. Source : DGT

The General Directorate of Traffic has been working for years with the aim of reducing the number of accidents and mortality on our roads. In recent years, progress has been made in different lines, from collaboration with other Administrations in improving infrastructure, adoption of new speed limits and measures that influence road users to be more aware of risk factors.

However, accidents continue to occur that could be avoided if road users (motorists, motorcyclists, cyclists, pedestrians, etc.) have the necessary tools to know in real time the dangers they encounter along their route, thus minimizing the risk of suffering an accident by having information sufficiently in advance to make a decision compatible with one's own road safety and that of other road users.

In this way, an intermediate Internet of Things (IOT) technology platform is offered between the actors and the end user, who makes use of the traffic routes, and who will be connected anonymously both to provide valuable information to the connected community, to consume it with the aim of detecting and being notified of dangerous situations that occur during the exercise of our mobility.

DGT 3.0 is an access point for unique, free and accurate information in real time about what is happening on roads and urban roads, information of great value for the entire mobility ecosystem, contributing to a safer, more comfortable travel experience. and efficient.

The DGT 3.0 platform aims to be a centralizer of homogenized, updated and truthful information, and to cover these three aspects a series of services have been implemented that

can be used by those actors who want to share mobility information in a selfless manner, and/or consume it. free of charge to offer mobility services to end users.

Below are the services offered:

- Road breakdown warning
- Construction warning
- Data generated by vehicle sensors
- Virtual Variable Message Panel
- Monitoring of Large Transports
- Points of interest
- Location of roadside tow trucks in operation
- Sports events
- Parking lots
- Protection of Operators working on roads
- Cyclists on the road
- Loading and unloading information
- Traffic light information

The following figure shows the structure of the platform:

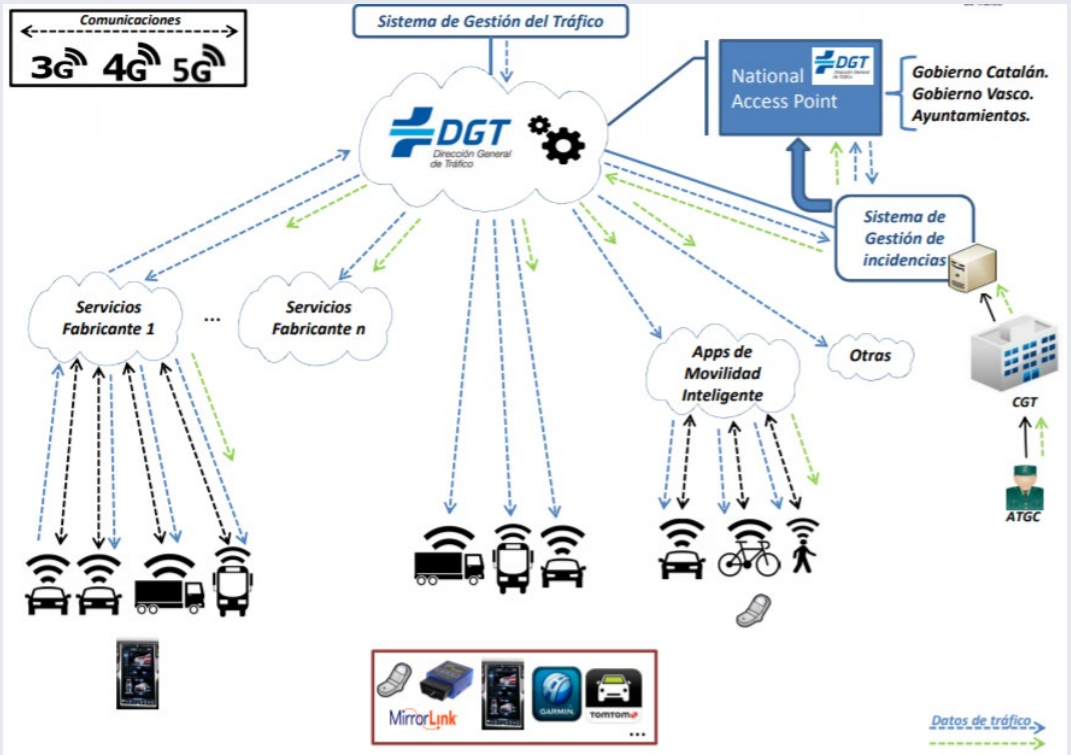


Illustration 71. Structure of the DGT 3.0 platform. Source: DGT

2.4.2.4 V16 pre-signaling devices

The V16 is an accident pre-signaling device that replaces the classic triangles to indicate that the vehicle has been immobilized on the road or that its load has fallen on it.

Illustration 72: V16 pre-signaling devices. Source: DGT

With the purpose of advancing in the field of road safety and accident reduction, the V16 device was born, which is called to replace the traditional danger pre-signaling triangles. It is a small yellow beacon that is equipped with connectivity and is capable of emitting a high intensity 360º light intermittently and continuously for at least 30 minutes. It incorporates a cell or battery with a useful life of a minimum of 18 months, regardless of whether it is rechargeable or not.

As of January 1, 2026, this device will be mandatory and, in the event of a breakdown or accident, it must be activated in a matter of seconds, preferably by placing it on the roof of the vehicle. At that moment, in addition to emitting the warning light signal, it will connect to the DGT 3.0 platform to transmit its location in real time and notify other road users of the situation.

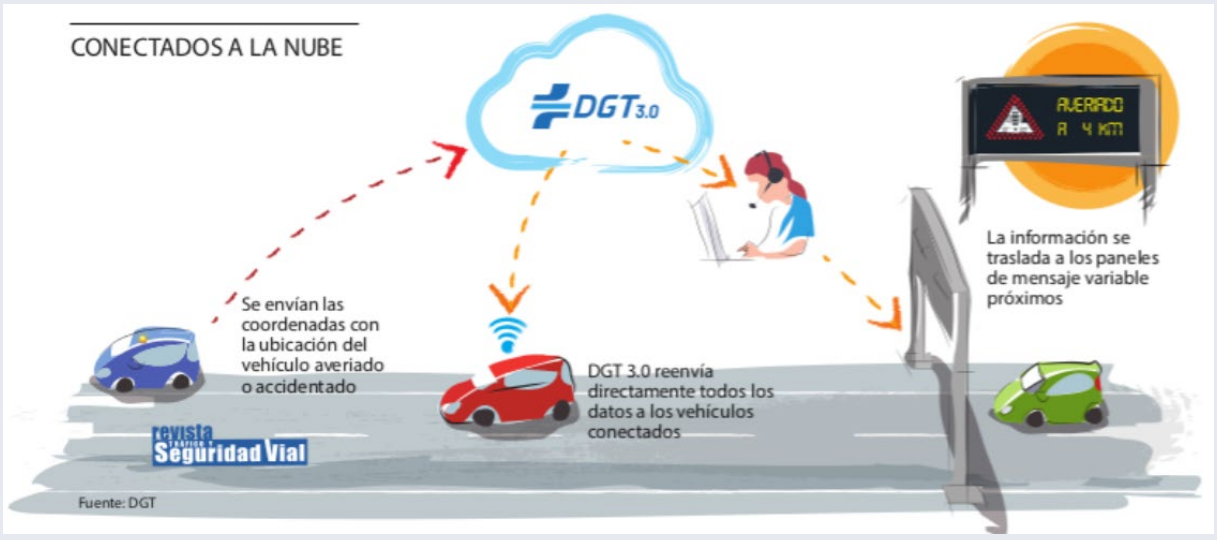


Illustration 73: V16 communication with DGT3.0. Source: DGT

2.4.2.5 Connected cones

One of the critical points in terms of road accidents are the sections with works, since there are not only vehicles involved but also operators who are working on the road. For this reason, new measures continue to be sought to improve security in this aspect.

In October last year, the General Directorate of Traffic introduced connected cones, a completely improved version of the usual orange elements found in road work zones. They

have the same appearance as the normal ones, although they have a novelty that can help prevent many accidents and, therefore, improve safety.

These cones have built-in DGPs that, every ten seconds, emit a signal that indicates the exact location of each one of them, which in turn allows us to show in real time where a section is under construction. This makes drivers able to anticipate that part of the road and increase precautions in advance.

These Personal Geolocation Devices are now mandatory for the operators themselves, since their location is known at all times and accidents can be avoided. These devices emit an automatic signal, which can be used, for example, on road information panels to inform those passing by that there are workers nearby.

This information is shared in real time through DGT 3.0 and the National Access Point.

Illustration 74: Connected cones. Source: DGT Magazine

2.5 2.5 Other initiatives / highlights

2.5.1 2.5.1 Description of other national initiatives / highlights and projects not covered by priority areas I - IV

Spain participates in other initiatives, platforms and projects that, although related to the four priority areas described above, do not fall within any of them clearly:

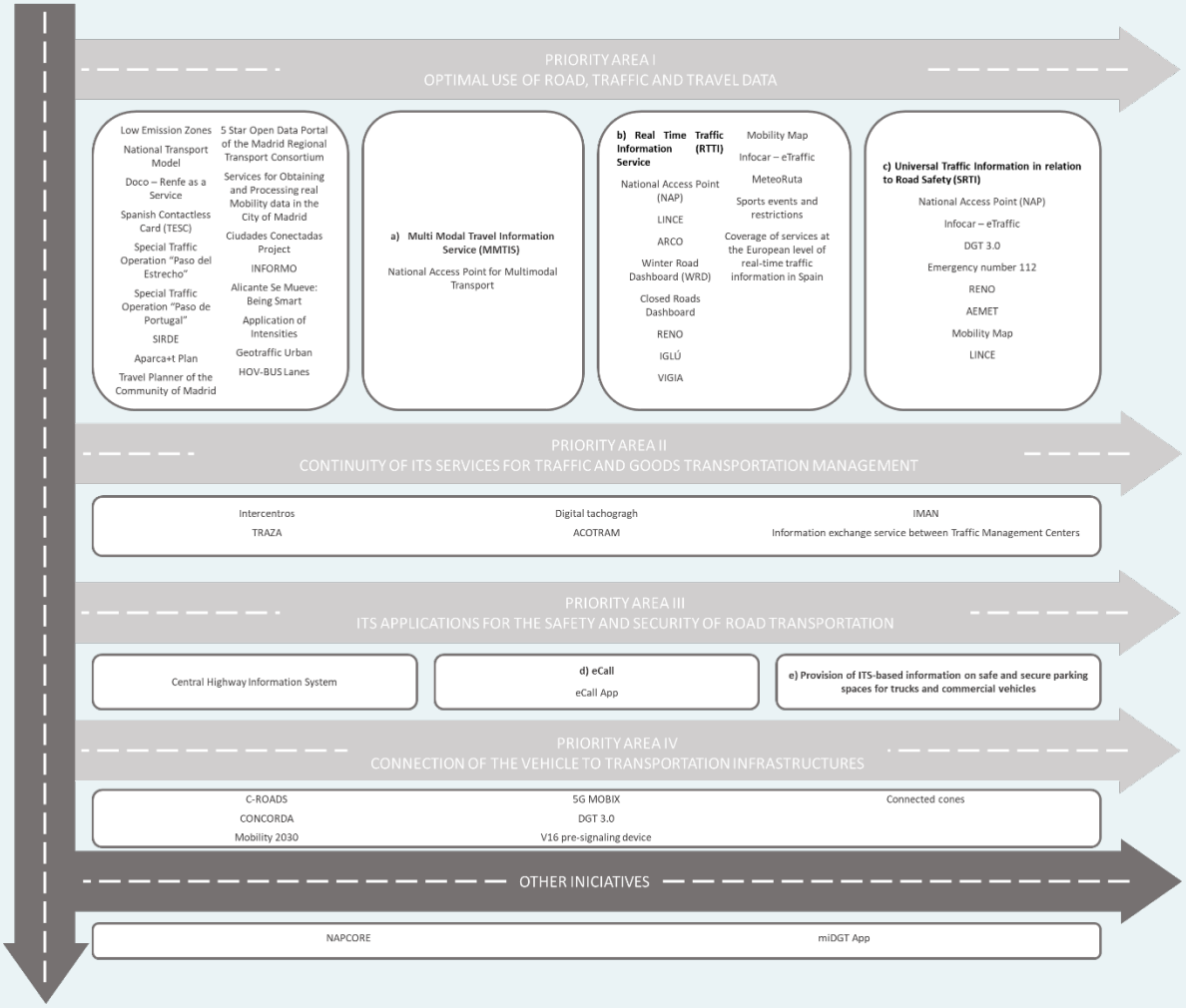


Illustration 75. Other initiatives. Source: Own Elaboration

2.5.1.1 NAPCORE

NAPCORE (National Access Point Coordination Organization for Europe) is the name of the organization formed to coordinate and harmonize more than 30 mobility data platforms across Europe.

The ITS Directive 2010/40/EU and its Delegated Regulations require each European Member State to establish a National Access Point (NAP) for mobility data. There are currently more than 30 national hotspots operational in virtually all EU Member States (and beyond), where mobility-related data is published and made available for use, e.g. in travel information services.

It has become apparent that existing NAPs are quite different in their configuration and data access interfaces. Furthermore, the data formats and standards used differ across Europe. To

work on better alignment, the National Access Point Coordination Organization for Europe (NAPCORE) project was launched.

NAPCORE is co-financed by a program support action under the European Commission's Connecting Europe Facility. NAPCORE has been launched as a coordination mechanism to improve the interoperability of national access points as the backbone of European mobility data exchange. NAPCORE improves the interoperability of mobility data in Europe with the harmonization and harmonization of mobility data standards. Furthermore, NAPCORE increases access and expands the availability of mobility-related data through coordinated data access and better harmonization of European NAPs. Furthermore, NAPCORE empowers national access points and national bodies by defining and implementing common procedures and strategies, strengthening the position and role of NAPs and supporting the creation of solutions at European level to better facilitate the use of data at EU level.

Illustration 76. NAPCORE website. Source: NAPCORE

NAPCORE has been created in a spirit of consultation and cooperation. It has 36 participants: 33 beneficiaries from 26 EU Member States and 3 associate partners. In addition, there are 37 implementing bodies. The initial implementation deadline for the Program Support Action is until the end of 2024, but the goal is to establish a long-lasting and future-oriented platform organization.

2.5.2 Progress since 2020

2.5.2.1 miDGT App

The General Directorate of Traffic makes available to users a free mobile application to carry the driving license and vehicle documentation in digital format on their mobile.

In addition, you can carry out procedures from it such as:

- Request a vehicle report
- Pay traffic fines
- Identify the driver of the vehicle
- Notify the usual driver
- Buy fees to carry out procedures
- Share the documentation of a vehicle owned

Among the data that can be accessed through the application are:

- General vehicle data, such as make, model, frame and displacement.
- Environmental distinctive.
- Data from the last MOT.
- Current insurance company and coverage dates.
- Information of the vehicle owner.
- Tax municipality in which the vehicle is domiciled.

Likewise, the APP notifies the user through alerts about any special situation regarding their vehicles, such as if they are on temporary leave due to theft, if they have a seizure, if they are renting, if they have any limitations for their transfer, etc. It also notifies about upcoming dates to take into account, such as the imminent expiration of the MOT or current insurance.

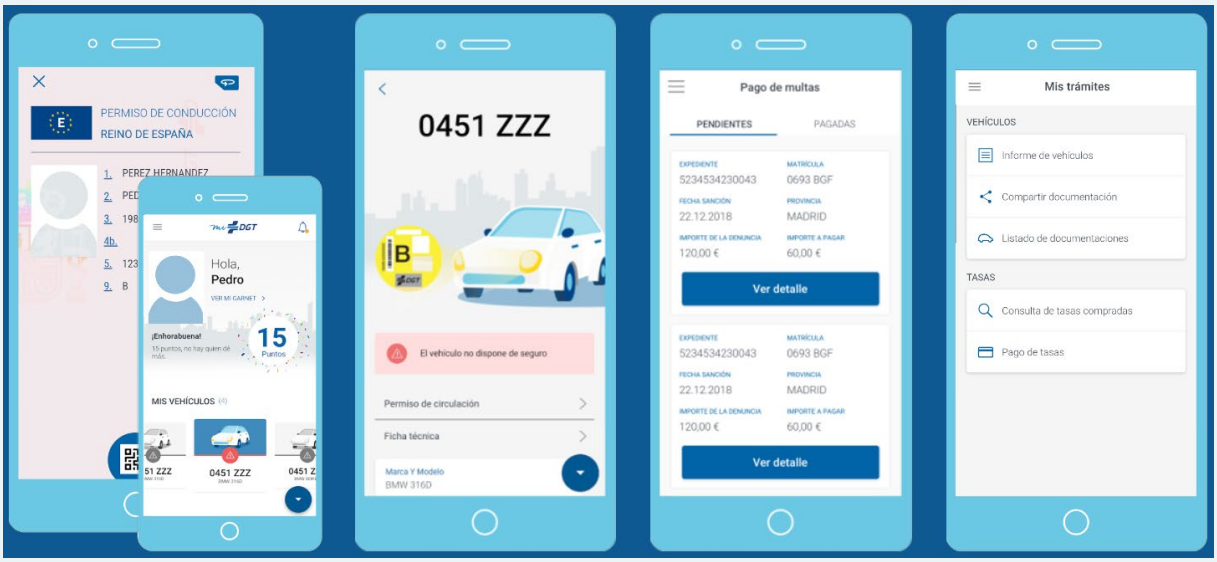


Illustration 77. MiDGT App. Source: DGT

3 Key Performance Indicators (KPIs)

Deployment KPIs

The deployment KPIS have been calculated according to the type of network considered. As a clarification, in the sections corresponding to "Other national roads", it should be noted that all those roads that are not part of the TEN-T network and that have some type of ITS equipment installed along their route have been considered (both high capacity roads and conventional roads).

3.1.1 Information gathering infrastructures / equipment (Road KPI)

Information gathering infrastructures / equipment refers to any ITS on the road, that allows traffic monitoring, control of weather or environmental conditions, emissions monitoring or traffic forecasting. It includes, for example, sensors, cameras, traffic control centers, floating vehicle data, etc.

The technologies used may differ depending on the country, network or geographical area amongst other things.

Infrastructure / equipment can serve several purposes, from traffic measurements to information services.

3.1.1.1 TEN-T Core

- Length of road network / road sections (in km) equipped with information collection infrastructure: 4.853 km
- Total length of the same type of road network (in km): 5.821 km
- KPI = (kilometres of type of road network equipped with information collection infrastructure / total kilometres of the same type of road network) x 100: 83%.

3.1.1.2 TEN-T Comprehensive

- Length of road network / road sections (in km) equipped with information collection infrastructure: 3.122 km
- Total length of the same type of road network (in km): 6.102 km
- KPI = (kilometres of type of road network equipped with information collection infrastructure / total kilometres of the same type of road network) x 100: 51%.

3.1.1.3 Other national roads

- Length of road network / road sections (in km) equipped with information collection infrastructure: 7.307 km
- Total length of the same type of road network (in km): 32.275 km
- KPI = (kilometres of type of road network equipped with information collection infrastructure / total kilometres of the same type of road network) x 100: 23%.

3.1.2 Incident detection (Road KPIs)

Incident detection refers to any ITS used to highlight traffic disturbances (e.g. accidents, congestion) on a section of the road network that can be used to trigger actions to manage the incident.

3.1.2.1 TEN-T Core

- Length of road network type / road sections (in km) equipped with ITS to detect incidents: 2.781 km
- Total length of the same type of road network (in km): 5.821 km
- KPI = (kilometres of type of road network equipped with ITS to detect incidents / total kilometres of the same type of road network) x 100: 48%.

3.1.2.2 TEN-T Comprehensive

- Length of road network type / road sections (in km) equipped with ITS to detect incidents: 1.551 km
- Total length of the same type of road network (in km): 6.102 km
- KPI = (kilometres of type of road network equipped with ITS to detect incidents / total kilometres of the same type of road network) x 100: 25%.

3.1.2.3 Other national roads

- Length of road network type / road sections (in km) equipped with ITS to detect incidents: 2.341 km
- Total length of the same type of road network (in km): 32.275 Km
- KPI = (kilometres of type of road network equipped with ITS to detect incidents / total kilometres of the same type of road network) x 100: 7%.

3.1.3 Traffic management and control measures (Road KPI)

Traffic management and traffic control measures refer to any measures derived from the ITS installed on the road that allow traffic movements to be controlled. It includes, for example, hard shoulder driving, ramp metering, dynamic lane management, heavy vehicle overtaking bans, variable speed limits, as well as parking management and vehicle prioritization.

3.1.3.1 TEN-T Core

- Length of type of road network / road sections (in km) covered by traffic management and control measures: 4.571 km
- Total length of the same type of road network (in km): 5.821 km
- KPI = (kilometres of type of road network covered by traffic management and control measures / total kilometres of the same type of road network) x 100: 79%.

3.1.3.2 TEN-T Comprehensive

- Length of type of road network / road sections (in km) covered by traffic management and control measures: 3.372 km
- Total length of the same type of road network (in km): 6.102 km
- KPI = (kilometres of type of road network covered by traffic management and control measures / total kilometres of the same type of road network) x 100: 55%.

3.1.3.3 Other national roads

- Length of type of road network / road sections (in km) covered by traffic management and control measures: 7.205 km
- Total length of the same type of road network (in km): 32.275 km

- KPI = (kilometres of type of road network covered by traffic management and control measures / total kilometres of the same type of road network) x 100: 22%.

3.1.4 Cooperative ITS services and applications (Road KPI)

Cooperative ITS services and applications refer to road-based ITS infrastructure that enables communication between vehicles or between vehicles and infrastructure.

3.1.4.1 TEN-T Core

- Length of road network type/road sections (in km) covered by cooperative ITS services and applications: 676 km
- Total length of the same type of road network (in km): 5.821 km
- KPI = (kilometres of type of road network covered by cooperative ITS services and applications/total kilometres of the same type of road network) x 100: 12%.

3.1.4.2 TEN-T Comprehensive

- Length of road network type/road sections (in km) covered by cooperative ITS services and applications: 189 km
- Total length of the same type of road network (in km): 6.102 km
- KPI = (kilometres of type of road network covered by cooperative ITS services and applications/total kilometres of the same type of road network) x 100: 3%.

3.1.4.3 Other national roads

- Length of road network type/road sections (in km) covered by cooperative ITS services and applications: 86 km
- Total length of the same type of road network (in km): 32.275 km
- KPI = (kilometres of type of road network covered by cooperative ITS services and applications/total kilometres of the same type of road network) x 100: 0%.

3.1.5 Real-time traffic information (Road KPI)

Real-time traffic information refers to information derived from any road and traffic data, or a combination of both, provided by any road authority, road operator or service provider to road users through the usual communication channels.

Real-time traffic information relates to the on-site traffic conditions on the road network. Such information includes, for example, accident locations, incident warnings (including safety related events/conditions), road works, congestion access points, travel times/delays. These services are covered by the Delegated Regulations 886/2013 and 962/2015.

3.1.5.1 TEN-T Core

- Length of type of road network/road sections (in km) with provision of real-time traffic information services: 5.821 km
- Total length of this same type of road network (in km): 5.821 km
- KPI = (kilometres of type of road network with provision of real-time traffic information services / total kilometres of the same type of road network) x100: 100%.

3.1.5.2 TEN-T Comprehensive

- Length of type of road network/road sections (in km) with provision of real-time traffic information services: 6.102 km
- Total length of the same type of road network (in km): 6.102 km
- KPI = (kilometres of type of road network with provision of real-time traffic information services / total kilometres of the same type of road network) x100: 100%.

3.1.5.3 Other national roads

- Length of type of road network/road sections (in km) with provision of real-time traffic information services: 32.275 km
- Total length of this same type of road network (in km): 32.275 km
- KPI = (kilometres of type of road network with provision of real-time traffic information services / total kilometres of the same type of road network) x100: 100%.

3.1.6 Dynamic Travel Information (Road KPI)

Dynamic travel information refers to updated information derived from any travel information provided by any transport operator or service provider through the usual communication channels. Such services fall within the scope of the Delegated Regulation on multimodal travel information services on which work is currently underway.

Dynamic travel information covers both pre-trip and in-trip information for any traveller. Such information includes, for example, interruptions, travel times/delays, vehicle positioning, accessibility of roads and vehicles. All information available to users should be provided in such a way that they can receive it in full, including for users who may have specific data requirements, e.g. persons with reduced mobility, orientation and/or communication.

3.1.6.1 TEN-T Core

- Length of the type of road network/road sections (in km) with provision of dynamic travel information services: 1.661 km
- Total length of the same type of road network (in km): 5.821 Km
- KPI = (kilometres of type of road network with provision of dynamic travel information services / total kilometres of the same type of road network) x 100: 29%.
- Number of transport nodes (railway or bus stations) with provision of DTI services: not enough data available to make a real comparison.
- Total number of transport nodes of the same type: not enough data available to make a real comparison
- KPI = (number of transportation nodes with provision of dynamic trip information services/ total number of transportation nodes of the same type) x 100: not enough data available to calculate an actual KPI

3.1.6.2 TEN-T Comprehensive

- Length of the type of road network/road sections (in km) with provision of dynamic travel information services: 982 km
- Total length of the same type of road network (in km): 6.102 km
  KPI = (kilometres of type of road network with provision of dynamic travel information services / total kilometres of the same type of road network) x 100: 16%.

- Number of transport nodes (railway or bus stations) with provision of PIT services: not enough data available for a real comparison.
- Total number of transport nodes of the same type: not enough data available to make a real comparison
- KPI = (number of transportation nodes with provision of dynamic trip information services/ total number of transportation nodes of the same type) x 100: not enough data available to calculate an actual KPI

3.1.6.3 Other national roads

- Length of the type of road network/road sections (in km) with provision of dynamic travel information services: 1.753 km
- Total length of the same type of road network (in km): 32.275 Km.
- KPI = (kilometres of type of road network with provision of dynamic travel information services / total kilometres of the same type of road network) x 100: 5%.
- Number of transport nodes (railway or bus stations) with provision of PIT services: not enough data available for a real comparison
- Total number of transport nodes of the same type: not enough data available to make a real comparison
- KPI = (number of transportation nodes with provision of dynamic trip information services/ total number of transportation nodes of the same type) x 100: not enough data available to calculate an actual KPI

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

Freight information refers to static and dynamic information adapted to the needs of the freight industry. Such information includes, for example, parking/loading availability and cost, access restrictions, incident and interruption warnings, travel times/delays, vehicle positioning.

3.1.7.1 TEN-T Core

- Length of the type of road network/road sections (in km) with provision of freight information services: 5.821 km
- Total length of the same type of road network (in km): 5.821 Km
- KPI = (kilometres of type of road network with provision of freight information services / total kilometres of the same type of road network) x 100: 100%.
- Number of loading nodes (e.g. ports, logistics platforms) with provision of freight information services: not enough data available for a real comparison.
- Total number of freight nodes of the same type: not enough data available to make a real comparison
- KPI = (number of freight nodes with provision of freight information services / total number of same freight nodes) x 100: not enough data available to calculate an actual KPI.

3.1.7.2 TEN-T Comprehensive

- Length of the type of road network/road sections (in km) with provision of freight information services: 6.102 km
- Total length of the same type of road network (in km): 6.102 km
- KPI = (kilometres of type of road network with provision of freight information services / total kilometres of the same type of road network) x 100: 100%.

- Number of freight nodes (e.g. ports, logistics platforms) with provision of freight information services: not enough data available for a real comparison.
- Total number of freight nodes of the same type: not enough data available to make a real comparison
- KPI = (number of freight nodes with provision of freight information services / total number of same freight nodes) x 100: not enough data available to calculate an actual KPI.

3.1.7.3 Other national roads

- Length of the type of road network/road sections (in km) with provision of freight information services: 32.275 km
- Total length of the same type of road network (in km): 32.275 Km
- KPI = (kilometres of type of road network with provision of freight information services / total kilometres of the same type of road network) x 100: 100%.
- Number of freight nodes (e.g. ports, logistics platforms) with provision of freight information services: not enough data available for a real comparison.
- Total number of freight nodes of the same type: not enough data available to make a real comparison
- KPI = (number of freight nodes with provision of freight information services / total number of same freight nodes) x 100: not enough data available to calculate an actual KPI.

3.1.8 112 eCalls (KPI viario)

112 automatic and manual eCalls as defined by EU legislation.

As defined in the COCOM questionnaire at 112, dummy calls are calls that are not followed up with intervention or assistance from the PSAP or the emergency services. Calls that report an emergency event that has already triggered intervention or assistance by the PSAP and that do not involve separate intervention or assistance, will not be considered as hoax calls.

N/A. - To be provided through COCOM 112 questionnaire.

Illustration 78. eCall – The lifebutton. Source: DGT Magazine

Illustration 79. How eCall Works in Spain. Source: DGT Magazine

3.2 Benefits KPIs

3.2.1 Change in travel times (Road KPI)

Percentage change in travel times in peak period along routes/in areas where ITS have been implemented or improved.

The peak period refers to the time with the highest traffic flow during a day of the week. It is defined for each route/area individually. An aggregate average can be calculated for the estimation of consolidated results at the level of the road network.

Routes/areas where ITS have been implemented or improved must be specified. The length / area along which the change in travel times is measured should be long enough / wide enough to be representative.

- KPI = ((travel times before ITS implementation or improvement - travel times after ITS implementation or improvement) / travel times before ITS implementation or improvement) x 100: not enough data available to calculate an actual KPI.

3.2.2 Change in road accidents resulting in death or injury (Road KPI)

Every year, the DGT makes an inventory of the number of accidents on national roads. These accidents are classified according to the type of road on which they occur and the severity of the accident.

In addition to these data, accidents are listed according to the type of accident suffered and the personal characteristics of the victim.

- Personal characteristics:
  - Age of the victim
  - Gender of the victim
  - Pedestrian/Driver/Passenger
- Characteristics of the accident:
  - Province where the accident occurs
  - Infraction committed
  - Brightness and atmospheric factor
  - State and type of vehicles involved
  - Age of the vehicles involved

The figures that appear in the following sections compare the data from the statistical studies published by the DGT in 2018, which were used in the preparation of the STI Report for 2020, and the data from 2022, the last year for which data is available. published.

3.2.2.1 Interurban roads

3.2.2.1.1 ACCIDENTS WITH VICTIMS

- Number of road accidents resulting in death or injury before ITS implementation or improvement: 37.892.
- Number of road traffic accidents that resulted in death or injury after ITS implementation or improvement: 33.300
- KPI = ((number of road traffic crashes resulting in death or injury before ITS implementation or improvement - number of road traffic crashes resulting in death or

injury after ITS implementation or improvement) / number of road traffic crashes resulting in death or injury before ITS implementation or improvement) x 100: (-13.79%).

3.2.2.1.2 ACCIDENT VICTIMS

- Number of traffic accidents that resulted in accident victims before ITS implementation or improvement: 58.892
- Number of traffic accidents that resulted in accident victims after ITS implementation or improvement: 49.963
- KPI = ((number of traffic accidents that resulted in accident victims before ITS implementation or enhancement - number of traffic accidents that resulted in accident victims after ITS implementation or enhancement) / number of traffic accidents that resulted in accident victims before ITS implementation or enhancement) x 100: (-17.87%)

3.2.2.1.3 FATALITIES

- Number of road accidents resulting in death before ITS implementation or improvement: 1.317.
- Number of traffic accidents that resulted in death after ITS implementation or improvement: 1.273.
- KPI = ((number of traffic accidents that resulted in fatalities before ITS implementation or enhancement - number of traffic accidents that resulted in fatalities after ITS implementation or enhancement) / number of traffic accidents that resulted in fatalities before ITS implementation or enhancement) x 100: (-3.46%)

3.2.2.1.4 SERIOUSLY INJURED

- Number of traffic accidents resulting in Seriously injured before ITS implementation or improvement: 4.451.
- Number of traffic accidents that resulted in Seriously injured after ITS implementation or upgrade: 3.892.
- KPI = ((number of traffic accidents that resulted in serious injury before ITS implementation or upgrade - number of traffic accidents that resulted in serious injury after ITS implementation or upgrade) / number of traffic accidents that resulted in serious injury before ITS implementation or upgrade) x 100: -14.36%.

3.2.2.1.5 SLIGHTLY INJURED

- Number of traffic accidents resulting in Slightly injured before ITS implementation or improvement: 53.124.
- Number of traffic accidents resulting in Slightly injured after ITS implementation or improvement: 44.798.
- KPI = ((number of traffic accidents resulting in Slightly injured before ITS implementation or improvement - number of traffic accidents resulting in Slightly injured after ITS implementation or improvement) / number of traffic accidents resulting in Slightly injured before ITS implementation or improvement) x 100: (-18.59%).

3.2.2.2 Urban Roads

3.2.2.2.1 ACCIDENTS WITH VICTIMS

- Number of road traffic accidents resulting in death or injury before ITS implementation or improvement: 64.407
- Number of road traffic accidents that resulted in death or injury after ITS implementation or improvement: 64.616
- KPI = ((number of road traffic crashes resulting in death or injury before ITS implementation or improvement - number of road traffic crashes resulting in death or injury after ITS implementation or improvement) / number of road traffic crashes resulting in death or injury before ITS implementation or improvement) x 100: 0.32%.

3.2.2.2.2 ACCIDENT VICTIMS

- Number of traffic accidents that resulted in accident victims before ITS implementation or improvement: 81.523.
- Number of traffic accidents that resulted in accident victims after ITS implementation or improvement: 79.613.
- KPI = ((number of traffic accidents that resulted in accident victims before ITS implementation or upgrading - number of traffic accidents that resulted in accident victims after ITS implementation or upgrading) / number of traffic accidents that resulted in accident victims before ITS implementation or upgrading) x 100: -2.40%.

3.2.2.2.3 FATALITIES

- Number of road accidents resulting in death before ITS implementation or improvement: 489.
- Number of traffic accidents that resulted in death after ITS implementation or improvement: 473.
- KPI = ((number of traffic accidents resulting in death before ITS implementation or enhancement - number of traffic accidents resulting in death after ITS implementation or enhancement) / number of traffic accidents resulting in death before ITS implementation or enhancement) x 100: -3.38%.

3.2.2.2.4 SERIOUSLY INJURED

- Number of road accidents resulting in Seriously injured before ITS implementation or improvement: 4.484.
- Number of traffic accidents that resulted in Seriously injured after ITS implementation or upgrade: 4.610.
- KPI = ((number of traffic accidents that resulted in serious injury before ITS implementation or upgrade - number of traffic accidents that resulted in serious injury after ITS implementation or upgrade) / number of traffic accidents that resulted in serious injury before ITS implementation or upgrade) x 100: 2.73%.

3.2.2.2.5 SLIGHTLY INJURED

- Number of road accidents resulting in Slightly injured before ITS implementation or improvement: 76.550.
- Number of traffic accidents resulting in Slightly injured after ITS implementation or upgrade: 74.530.
- KPI = ((number of traffic accidents that resulted in Slightly injured before ITS implementation or improvement - number of traffic accidents that resulted in Slightly

injured after ITS implementation or improvement) / number of traffic accidents that resulted in Slightly injured before ITS implementation or improvement) x 100: -2.71%.

3.2.3 Changes in CO2 emissions linked to traffic

Traffic-related CO2 emissions refer to the amount of CO2 emitted collectively by vehicles using a route/driving within an area. This must be aggregated to produce an annual figure. CO2 emissions are generally estimated based on traffic flows and speeds, along with assumptions about fuel consumption and/or average vehicle efficiency per kilometre for different types of vehicles using a route/driving within an area.

The routes/areas where ITS have been implemented or improved should be specified. The length/area within which the change in CO2 emissions is calculated should be long enough/wide enough to be representative.

- KPI = (CO2 emissions from traffic before implementation or improvement of ITS - CO2 emissions from traffic after implementation or improvement) / CO2 emissions from traffic before implementation or improvement of ITS) x 100: not enough data available to calculate an actual KPI.

Illustration 80. DGT environmental badges. Source: www.ITV.com

3.3 Financial Performance Indicators

The following table details the investments made in ITS equipment maintenance of all devices installed on the roads in the last three years:

Table 59: Maintenance costs related to ITS equipment. Source: DGT

YEAR	MAINTENANCE
2020	17.000.000,00 €
2021	17.500.000,00 €
2022	16.500.000,00 €
AVERAGE	**17.000.000,00 €**

For the calculation of the KPIs the average of the values will be taken in order to "annualise" the figures and make them comparable with those of previous reports.

As in the last report, it should be noted that all types of ITS systems and services are considered in the calculation.

- Annual investment in road ITS (as a % of total transport infrastructure investment): not enough data available to calculate an actual KPI.
- Annual costs of road ITS operation and maintenance (in euros per kilometre of network covered):
    - Annual operation and maintenance cost: 17,00 M
    - Total number of kilometres considered: 44.198 km
    - KPI: 384,63 euros/km

Illustration 81. ITS Maintenance. Source: Own Elaboration

4 Contributions

For the development of this report, the collaboration of different administrations and entities has been fundamental. Thanks to them it has been possible to provide the document with the corresponding entity:

- General Directorate of Traffic - Ministry of the Interior
- Ministry of Transport and Sustainable Mobility
- TEKIA Ingenieros S.A.
- Antea Group

5 References

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- Delegated Regulation (EU) No 2015/962 supplementing Directive 2010/40/EU of the European Parliament and of the Council as regards the provision of real-time traffic information services throughout the European Union.
- Delegated Regulation (EU) No 886/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council as regards data and procedures to provide, where possible, minimum universal traffic information relating to road safety, free of charge to the user.
- Delegated Regulation (EU) No 2022/670 of 2 February 2022 supplementing Directive 2010/40/EU of the European Parliament and of the Council as regards the provision of information services on traffic in real time at European Union level.
- Delegated Regulation (EU) No 305/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonised provision of an emergency call number throughout the Union (eCall)
- Delegated Regulation (EU) No 885/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council as regards the provision of information services for safe and secure parking areas for trucks and commercial vehicles.
- ROYAL DECREE 662/2012 of 13 April, establishing the framework for the deployment of Intelligent Transport Systems (ITS) in the road transport sector and for interfaces with other transport modes.
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- LINCE - Winter Roads Control Panel. S.D.G. for Mobility. General Directorate for Traffic. Ministry of the Interior.
- LINCE - Winter Roads - Events Model. General Sub directorate of Mobility and Technology. General Directorate for Traffic. Ministry of the Interior.
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- Connected Vehicle Platform (DGT 3.0). General Sub directorate of Mobility and Technology. General Directorate for Traffic. Ministry of the Interior.
- NAP implementation in Spain. General Sub directorate of Mobility and Technology. General Directorate for Traffic. Ministry of the Interior.

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