Directive 2010/40 / EU Progress Report 2017 *Czech Republic*

12th October 2017

1 Introduction

1.1 General overview of the national activities and projects

During the period under review major activities aimed at the development of Intelligent Transport Systems in the Czech Republic were launched and implemented. In consultation with the public sector, the private sector and academia the Ministry of Transport has drawn up a strategic document entitled “Action Plan for ITS Development", as well as a follow-up (implementation) document "ITS Implementation Plan". Both documents have been approved by the Czech Government. Several project plans listed in the Implementation Plan for ITS Development relate to the implementation of standards and norms in line with the ITS 2010/40/EU Directive and its successor regulations. Through the Czech Ministry of Transport and the Czech Roads and Motorways Directorate, the Czech Republic is involved in European CEF projects focused on the development of the priority areas and actions of ITS Directive 2010/40/ EU (C-Roads, Crocodile, etc.) There is also progress in implement planned projects of national importance for the development of ITS systems to improve traffic safety and continuity and also to increase the level of driver and traffic participant awareness. The National Transport Information Centre is gradually being modernised in order to apply standardised data exchange formats with the option to provide data outputs to third parties through a defined interface, in line with to the requirements of Regulations 885/2013, 886/2013, 962/2015.

Most significant national activities and projects

ITS Development Action Plan

The basic strategy for the use of ITS is defined by the government approved "Intelligent Transport Systems (ITS) Intelligent Road Development Action Plan (ITS) in the Czech Republic to 2020 (with outlook up to 2050)" - hereinafter the "Action Plan". This is a strategy document for the use of diagnostic, information, control and security technologies, based on ITS, GNSS and Earth observation detection systems. This document analysed the development status of ITS and pointed out persistent problems in ITS operation in the Czech Republic, thereby providing a comprehensive overview of the current situation. The Action Plan also set out a vision of the resulting (ideal) state of ITS operation and on that basis proposed the measures necessary to progressively improve the current situation, not only from a technical but also from an organisational point of view, in order to improve the interdependence of the individual transport modes. This vision gives rise to the global goal of ensuring smooth, safe and energy-efficient transport.

The Action Plan, as approved by the Czech Government in its Resolution No 268 of 15 April 2015, is available for download at the following link:

AP ITS - CZ version:

http://www.czechspaceportal.cz/files/files/ITS_new/AP%20ITS/AP%20ITS%20CZ%20(HQ).pdf

AP ITS - EN version:

http://www.czechspaceportal.cz/files/files/ITS_new/AP%20ITS/AP%20ITS%20EN%20(HQ).pdf

ITS Development Action Plan

The ITS Action Plan builds on the ITS Implementation Plan, which has already addressed the preparation and implementation of ITS projects. The ITS Development Implementation Plan includes several dozen projects and project plans related to ITS development, especially in road and rail transport. This plan is not merely a one-off document, but an open, live document, which will be updated and supplemented up to 2020 on the basis of long-term and short-term planning and programmed selection of specific project plans, or more exactly, of development projects to be financed.

The ITS Development Implementation Plan, as approved by the Czech Government in its Resolution No 538 of 15 June 2016 (including Update No 1 as at April 2017, approved by the Czech Government in its Resolution No 374 of
15 May 2017) is available for download at the link below (CZ version

only): IP ITS:

http://www.czechspaceportal.cz/files/files/ITS_new/IP%20ITS/IP%20ITS%20-%20Kompletn%C3%AD.pdf

Update 1 IP ITS:
http://www.czechspaceportal.cz/files/files/ITS_new/IP%20ITS/Aktualizace%20IP%20ITS%20-%20Kompletn%C3%AD.pdf

Update No 1 of the ITS Development Implementation Plan as at April 2017, gives a total of 80 projects and project plans. Of these,

- 8 projects have been completed
- 28 projects are in the preparatory phase
- 16 projects are under implementation
- 28 projects are in the form of concept plan

Changes compared to the original ITS Implementation Plan:

- Changes were made to 40 of these 80 projects and project plans
- 18 projects remain unchanged
- 14 project plans were newly added
- the main changes concern a shift in the implementation schedule, or more exactly, in the transitions from plan to preparation or from preparation to implementation

Scheduled deployments:

- during 2017, implementation start was planned for 34 projects
- 12 projects should be implemented in 2018
- implementation of the remaining projects is planned for after 2018, or the implementation year has not yet been set

Project C - Roads Czech Republic

The C-Roads Czech Republic project focuses on cooperative transport systems. The coordinator is the Czech Ministry of Transport. The partners of the project are the Czech Roads and Motorways Directorate, the Railway Infrastructure Administration, AŽD Praha s.r.o., Transport Faculty of ČVUT in Prague, Brněnské komunikace a.s., O2 Czech Republic a.s., T-Mobile Czech Republic a.s. and INTENS Corporation s.r.o. Also involved in the project are Dopravní podnik Ostrava a.s., Plzeňské městské dopravní podniky a.s., ŠKODA Auto a.s. and Vodafone Czech Republic a.s. as part of technical solution consultations. Dopravní podnik Karlovy Vary a.s. a Dopravní podnik hl. m. Prahy a.s. also asked to be involved in the project.

Within the framework of the project, implementation, pilot testing and deployment of cooperative ITS technologies will take place on specific sections of the motorway network in the Czech Republic. However, the project is not only focused on motorways. The City of Brno, through its wholly owned company Brněnské komunikace a.s., will, in close cooperation with the Czech Roads and Motorways Directorate, set up a systematic approach to the implementation of cooperative systems in the city and create the conditions for their effective deployment. The aim in particular is to optimise traffic flows in the city of Brno, with special emphasis on trunk and transit routes. The project will also test the use of C-ITS systems in urban public transport, specifically in Pilsen and Ostrava, where passenger transport companies have committed to providing their vehicles and infrastructure for testing. In the case of Ostrava, a warning will also be tested for drivers coming up to a crossing with an approaching tram, especially on a single-track inter-urban tram track. The results may be used in the construction of tram-trains in the Czech Republic. At the same time, testing is planned at railway crossings, whereby the Railway Infrastructure Authority has allocated two level crossings in the Pardubice region for this purpose, equipped with security equipment to increase safety and thus reduce the number of those injured and killed as a result of the collision of a train with road transport by advising (warning) vehicle drivers in the near vicinity of an approaching train.

Project I_HeERO

A Czech consortium, composed of the Ministry of Transport, the Fire Rescue Service of the Czech Republic (Ministry of the Interior) and Vítkovice IT Solutions, Telematix and Dekra, is participating in the implementation of two 112 emergency call centres for eCall emergency call reception and processing (Prague, reserve in Ostrava), including the setting up of the so-called conformity assessment service and the design and pilot testing of the eCall 112 system for the transport of dangerous goods. Upgrading and assessing of these centres is a prerequisite for meeting the requirement imposed by EU law - the ITS Directive and the decision to deploy the interoperable eCall service across the EU. The I_HeERO project thus provides a unique opportunity to meet the requirements for introducing the eCall system in the EU imposed by European legislation and also to adapt these requirements to those conditions in the Czech Republic which may differ from those of other Member States.

Project CROCODILE

The implementation of the CROCODILE 2 project is currently underway, which is a continuous follow-on from the CROCODILE project. The CROCODILE 2 project provides for a common approach by the Czech Republic, Austria, Germany, Slovakia, Poland, Hungary, Slovenia, Croatia, Italy, Romania, Bulgaria, Greece and Cyprus to ensure a minimum of traffic information, truck parking information and public traffic information in real time

This is already in the implementation phase that will allow the establishment of a national access point for collecting and processing traffic information, making it available for further dissemination and cross-border exchange of this information between individual neighbouring states. The implementation of the uniform DATEX II format for data exchange between participants will also be completed as part of the project. The project also focuses on a process which will verify whether participants are complying with the quality requirements for the information services provided.

The Czech Republic is represented in the CROCODILE project by the Czech Ministry of Transport which, in cooperation with the Czech Roads and Motorways Directorate, coordinates activities which simultaneously focus on the implementation of delegated acts based on the ITS 2010/40/EU Directive on the provision of traffic information, providing freight parking information and real-time public transport information across the Union. Specifically, this is the implementation of Commission Regulations (EU) 885/2013, 886/2013 and 2015/962 under the conditions of the Czech Republic.

Project URSA Czech Republic

The URSA Czech Republic project reflects the need for the Czech motorway operator - the Czech Roads and Motorways Directorate - to provide specifically for truck drivers real-time high-quality information which is currently unavailable or available only to a very limited extent. It is essential to collect relevant data through the National Transport Information Centre, to process it, generate reliable information and disseminate it using current distribution channels. It is also important to develop new services focussed on information for truck drivers in a given area.

Implementation in the Czech Republic will focus on two main areas: intelligent truck parking and real-time information provision for truck drivers. Both of these services will be deployed on the Czech part of the Baltic-Adriatic Corridor connecting the Adriatic ports in Italy via Austria and the Czech Republic with the Baltic ports in Poland.

Floating Car Data

The main objective of the System for Floating Car Data Monitoring (FCD) is to provide real-time information on the current traffic situation based on anonymised floating vehicle data. Therefore, current traffic data will be available to all potential users free of charge on request for further use in downstream systems (e.g. for Regions, cities, application developers, etc.). Data on the historical behaviour of traffic flows on the traffic network will also be accessible for the needs of transport engineers and the related needs of state and public administration.

As part of the further improvement of the data outputs from FCD systems, FCD data will be integrated directly through the National Traffic Information Centre using data fusion with existing traffic data (e.g. From traffic detectors, traffic data from toll gates, data from cooperative systems, etc.). This will make it possible to offer all users added value to a guaranteed quality standard while ensuring high data availability.

1.2 General progress since 2014

Road transport

The ITS Development Implementation Plan includes a total of 26 projects and project plans for road transport.

These project plans also concern the development of the National Traffic Information Centre (NTIC) in Ostrava. They focus mainly on the further development of the NTIC in response to the current needs and trends in the organisation and management of transport, the modernisation of NTIC

technical equipment and the introduction of a uniform format for exchanging traffic information, consolidating data sources, etc. The common aim of these project plans is a higher quality of the functions provided by the NTIC, fulfilment of the objectives and measures arising from the strategy documents for the transport sector in the Czech Republic.

Other project plans concern compliance with road traffic rules. These include, for example, fixed distance speed measurement on motorways, or automatic weighing of vehicles on the road network directly on the move.

For project plans concerning the management and influencing of road traffic, these are for example, additions to the information gantries on motorways, or the modernisation of the existing traffic telematics systems. An important project goal is the development of line traffic management.

Among the most important projects is a project called "C-Roads Czech Republic", dealing with co-operative systems, which should be completed by 2020.

The last group of project plans in road transport focuses on transmission communication technologies, sensors and actuators located along the road infrastructure of the Highways Authority.

Rail transport

The ITS Development Implementation Plan includes a total of 20 projects and project plans for rail transport.

Project plans in rail transport are focused, for example, on services provided to passengers. Specifically, this is the digitisation of travel documents and the consolidation of information systems on the Railway Infrastructure Authority infrastructure, which will simplify passenger clearance.

Other project plans deal with rail traffic management. The major project plans include the "Control Centre for the Rail Traffic Management" (Cz: KAC), where the second phase is now in preparation. In addition, a Central Dispatching Centre (Cz: CDP) in Přerov and Prague will be developed, which will bring savings arising from the centralised operation of rail transport and increased rail traffic safety. The trackside part of the automatic train management system will be extended to automate rolling stock control on the Railway Infrastructure Authority lines, which will be beneficial from the point of view of traction energy consumption, more precise adherence to journey times and rail traffic safety. The use of GPS, EGNOS and Galileo satellite systems is also anticipated for information on the location of rail vehicles in order to increase the safety and continuity of rail traffic.

In addition, project plans are focused on the technical defects in railway vehicles and high-risk or unlawful behaviour of people near railway lines. Early detection of vehicle faults directly on train journeys, thanks to state-of-the-art diagnostic systems, will above all increase rail traffic safety and continuity. Similar benefits will arise from the project plan to reduce dangerous behaviour of drivers and pedestrians in the vicinity of railway vehicle and pedestrian crossings.

The remaining project plans focus on railway transport data and information systems.

Inland Water Transport

The ITS Development Implementation Plan includes a total of 3 projects and project plans for inland water transport.

Two of these projects are in preparation, while the third project is already being implemented. In the short term, around 2018, the project plan for radio-traffic should be completed, with the aim in particular of covering the waterways network with two-way voice communication between vessels

and the River Information Service control centre. This solution will increase the functionality and improve the work of the River Information Service.

Another project plan currently being implemented deals with the harmonisation of RIS services within the TEN-T corridors in order to ensure reliable coverage for the collection of AIS data transmitted by vessels, thereby increasing traffic safety. It also introduces other functionalities harmonised at the European waterway corridors level to promote more efficient modern water transport. The final project plan is focused on remote control of the navigation locks.

Cross-sectional project plans

The ITS Development Implementation Plan includes a total of 31 projects and project plans, mainly related to data acquisition and traffic information provision.

The expansion, consolidation and management of traffic and spatial data are addressed in project plans whose implementation is planned for medium- and longer-time horizons. This includes, for example, updating and harmonising the Global Network data set. Very important project plans include a system for across-the-board continuous monitoring of traffic flow dynamics, which will provide real-time information on the current road traffic situation.

Other plans can be categorised as services provided to road users. There is, for example, a truck parking service, an eCall trial operation using the 112 emergency call number prior to the start of full-time operation in 2018.

Project plans related to public passenger transport focus mainly on extending the single access point for access to data on public passenger transport. They also deal with the modernisation of the National Timetables Information System (NTIS) and its expansion with other data elements.

Another project plan focuses on the interconnection and exchange of data between the sales and reservation systems of different carriers in public passenger transport.

One of the newly added project plans in this category is "Monitoring mobility of people based on mobile data signalling data - BIG DATA from mobile networks", which will contribute to a significant increase in the technical and organisational connectivity of the individual public administration bodies involved in organizing, managing, mobility and planning of transport and mobility.

The certification and process of ITS compliance verification

The Ministry of Transport of the Czech Republic provides state supervision pursuant to Act No. 13/1997 Coll., on Roads, as amended (the "Roads Act"), into which Directive 2010/40/EU of the European Parliament and of the Council on Intelligent Transport Systems was transposed. In the context of the requirements of the Commission's delegated powers to the above-mentioned ITS Directive, it is necessary to establish a system for the quality control of the traffic information collected and provided. It is also necessary to develop the implementation of the ISO 21707 standard using the ITS data quality assessment methodology of the European Quantis project. Furthermore, it is necessary to identify the most appropriate body for assessing compliance with ITS requirements, the so-called Nominated Body for ITS Conformity Assessment. Regulations concerned:

- EC Commission Delegated Regulation (EU) No 885/2013 of 15 May 2013 on the provision of information services for safe and secure parking places for trucks and commercial vehicles;
- EU Delegation Regulation (EU) No 886/2013 of 15 May 2013 with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users;

- A regulation is in preparation for Priority Action a) of the ITS Directive

In 2015, the Ministry of Transport, in view of future development and investment in ITS, commissioned a methodology for ITS conformity assessment. The methodology was approved at the end of 2016. This is based entirely on the results of the ITS EIP and proposed concrete steps for the period 2017-2021. On the basis of this methodology, the Ministry of Transport initiated the process of appointing the Nominated Body in line with Regulation 885/2013 in order to unify and methodologically grasp the field of conformity assessment and to prepare the organizational and technical basis for a Government Regulation on conformity assessment of ITS equipment, services and applications by 2021. The methodology furthermore identifies the need to implement and fund a set of ITS demonstrators to realistically test the available innovative and existing transport data collection technologies to meet the requirements of each EU Regulation, to develop technical specifications for the definition of individual services/applications/facilities and testing procedures and to prepare a state investment strategy for these technologies, taking into account the priority zones set. In 2017, the first demonstrator was implemented, an SFTI project to meet the requirements of Regulation 885/2013 on the provision of information on the occupancy of motorway rest areas, the project "Information system for the occupancy of parking places for freight and commercial vehicles on rest areas *in the TEN-T network"*.

As the conformity assessment does not relate to products but to services (systems), negotiations are ongoing with the Office for Standards, Metrology and Testing (Cz: ÚNMZ) on the legal procedure for the establishment of the nominated ITS conformity assessment body. It is expected that the Transport Research Centre, v.v.i. (Www.cdv.cz) will be assigned as the nominated ITS conformity assessment body.

1.3 Contact information

Martin Pichl
Ministry of Transport of the Czech Republic
Deputy Director and Head of Intelligent Transport Systems and R&D&I Unit
ITS, Space Activities and R&D&I Department
Phone: +420 225 131 395s
Email: martin.pichl@mdcr.cz

Lukáš Diblík
Ministry of Transport of the Czech Republic
Intelligent Transport Systems and R&D&I Unit
ITS, Space Activities and R&D&I Department
Phone: +420 225 131 654
Email: lukas.diblik@mdcr.cz

2 Projects, activities and initiatives

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

2.1.1 Description of the national activities and projects

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

COMPLETED PROJECTS since 2014

Reconstruction of the National Transport Information Centre (NTIC) dispatching centre - The subject of this project was the reconstruction of the dispatching centres of the National Transport Information Centre (NTIC) and the reconstruction of the audio-visual technology, including the large-scale display system of. The technological equipment of the NTIC dispatching centre was physically and ethically obsolete, a significant part of the HW was no longer supported by the manufacturers, and there were problems with the reliability of individual devices and the availability of spare parts.
Main implementation objective: The aim of the implementation was to renew the NTIC technologies in order to ensure high availability of the services provided and sustainability of the installed technologies.
Implementation deadline: 2017
Responsible organisation: Road and Motorways Directorate

Developing a 10-year Uniform Traffic Information System (Cz: JSDI)/NTIC Strategic Development Plan - the draft Strategic Plan has being finalised and is currently undergoing approval. This plan has defined the role and set the direction for further development of the JSDI/NTIC, delineated the functional scope, proposed JSDI/NTIC cooperation with other systems operated by both public and private entities at national and international level, assessed the current and recommended directions for further development of road transport organisation in the Czech Republic. In addition, it has reviewed the JSDI/NTIC regulatory and organisational framework, assessed the performance and quality of JSDI/NTIC services and proposed specific actions within the timeline necessary to implement the plan.
Main implementation objective: Formulation of the assignment of specific actions and projects aimed at implementing the strategic plan for NTIC development.
Implementation deadline: 2017
Responsible organisation: Road and Motorways Directorate

Localisation tables for RDS-TMC - Regular updating took place of localisation tables in line with the new certification requirements required for broadcasting traffic messages from the Czech Republic's Uniform Traffic Information System for navigation, including new functions that affect the accuracy and geographical precision of the information provided.
Main implementation objective: Without regular updating of the localisation tables and new TMC Forum certifications, it is not possible to localise traffic incidents for RDS-TMC broadcasting to in-car navigation devices and for further traffic information sharing.
Implementation deadline: 2016
Responsible organisation: Road and Motorways Directorate

Extension of spatial data in the border area to ensure the international interoperability of ITS information - for the provision of traffic information and their interoperability in the context of the road network around the Czech Republic the National Transport Information Centre needed to extend the database of spatial data on the border area of the Czech Republic to20 km from the borders of the Czech Republic.

Main implementation objective: In the immediate vicinity of the Czech Republic (about 5 km) it was necessary to obtain road data including a number of navigation attributes, additional functional and identification elements (such as motorway exits, bridges, underpasses, tunnels, railway crossings, km points on the national road network and SOS messages), railway management, localisation of water areas, points of interest, and possibly elements of tourist infrastructure. In the related zone at a distance of 15-20 km from the border, at least road data with basic navigational attributes.

Implementation deadline: 2016
Responsible organisation: Road and Motorways Directorate

PROJECTS ONGOING AND UNDER PREPARATION

Implementation of DATEX II data format to National Traffic Information Centre - Continuous project currently being implemented. Existing DDI information is broken down into related groups and converted by automated means (templates) from the ALERT-C description - Publication of traffic information is consistently required by the ITS Action Plan and the Regulation on the ITS 2010/40/EU Directive. The outcome of the project will be implemented in the form of the National Traffic Information Register (part of the Central Access Point).

Main implementation objective: The aim of this project is to extend the functionality of the existing distribution interface (DDI) of the NTIC system by publishing reports that today are published in the DDI format also in the DATEX II format in line with ČSN/CEN TS 16157 so that the existing distribution system allows certain new collection scenarios and ordering of collection. Included in the delivery are software, source, formats and protocols documentation, as well as source codes incl. related documentation in both Czech and English. The documentation will be published in the Traffic Information Register.

Implementation deadline: 2016 preparatory study - by the end of 2017
Responsible organisation: Road and Motorways Directorate

Overall Continuous Traffic Flow Monitoring System - Currently, a tender for system suppliers has taken place. The system will provide comprehensive information from the whole of the Czech Republic, or more exactly, the road network under the management of the Roads and Motorways Directorate in a segmentation and spatial resolution defined by the mandatory system technical parameters. The system will provide an open interface to aggregated data from all segments of the road network (delays, average speed, reliability, etc.). The SW is also defined so as to allow data fusion with other data sources (traffic detectors, toll systems, etc.). Within the project, a specialised SW interface/analytical application will be provided to enable real-time on-line display of the current and historical characteristics of traffic flows on the monitored network of the Czech Republic, including cities.

Main implementation objective: The main objective is to supply an across-the-board telematics

surveillance system and related services that will provide real-time information on the current traffic situation on the Czech Republic's strategic road network, including aggregate FCD and associated services data for a period of 5 years.

Implementation deadline: Beginning of 2018
Responsible organisation: Road and Motorways Directorate

Adding information portals to motorways - Between 2015 and 2017, the number of Information Portals is gradually being increased. The project deals with the construction of 18 new information portals equipped with variable traffic signs and equipment for operational information on the TEN-T network in the Czech Republic. Specifically, these are D3 - 1 unit; D8 - 1 unit; D11 - 8 units; D6 - 1 unit; D35 (Liberec) - 2 units; D35 (Olomouc) - 5 units. It is equipment that consists of a portal over the entire carriageway or a semi-portal located to the right-hand side with a walk-over gantry, variable traffic signs (Cz: PDZ) and traffic information text screens (Cz: ZPI). These signs inform drivers of events occurring on the road in locations in the direction the driver is currently heading. The signs usually show information about accidents, extreme weather condition, traffic levels, etc. The PDZ and ZPI are controlled centrally by dispatchers at the National Transport Information Centre.

Main implementation objective: The aim of the system is to ensure that road users are informed of the current traffic situation and weather.

Implementation deadline: 2016 - 2017
Responsible organisation: Road and Motorways Directorate

Completion and modernization of existing telematics systems - This project is ongoing and in the course of its implementation, the Czech Republic's road infrastructure is still being supplemented or modernised with further telematic elements. In particular, these are the following:

1) Camera systems - provide for remote surveillance of traffic status and also as a complementary element for the closer determination of the weather. This project envisages the construction of about 20 camera points located on the TEN-T network in the Czech Republic, which will complement the existing approximately 300 cameras. These are on the D1, D2, D8, D11, D0 and D35 motorways. Exact numbers are currently unknown.
2) The DIS - SOS system- an independent emergency call system on motorways in the Czech Republic, providing road users with an internal dispatching connection to the Operational Dispatching Centre(Czech Police or Fire Brigade) and through it to maintenance units, a medical service with help or service. D5 km 56-80: SOS emergency phones - Includes replacement of existing SOS emergency phones with the new digital IP system that is in use on the rest of the D5.
3) Weather stations - are of two kinds. They are either devices that provide comprehensive information on air temperature, wind direction and speed, type and intensity of precipitation, visibility, surface temperature, water levels, etc., where these data are used mainly by winter maintenance dispatchers or are local detectors of ice in problem locations, operating PDZs and warn drivers of dangerous weather phenomena such as the risk of icing or skidding risks. Both systems are modular and it is possible to build these systems in different configurations. An aim of the system is to provide the necessary weather information for winter maintenance. At the same time, when combined with the PDZ, they

improve road safety. The project involves the construction of about 10-12 SMS on existing motorways and 1st class roads.

4) Automatic Transport Counter (Cz: ASD) consists of induction loops in the road and evaluation units with a classifier located in a cabinet on the road. ASDs are devices that continuously count and classify vehicles into their respective classes. These data are centrally stored and then processed further. The aim of the system is to provide the necessary data on the current traffic situation in a given location.
5) Information portals - are mainly located on motorways to provide current traffic information to road users. The means for this is the traffic information text screens (ZPI), which allows the display of text information (three lines of text) fitted in tandem with the variable traffic signs (PDZ). Information on the ZPI and PDZ will be displayed on the basis of the traffic information evaluated by the control software and by the NTIC operators (or by any other local or regional dispatching centre). Communication between the control centre and an information portal takes place via the DIS-SOS system or, alternatively, another data link. The equipment is located about 2 to 5 km ahead of significant exits, which have an effect on redirecting traffic to alternative high-capacity roads in the event of calamities or to strategic locations for advising the traffic status of the relevant part of the area.

Main implementation objective: The main objective is to increase traffic flow and safety using modern telematics systems.

Implementation deadline: 2016/-2020
Responsible organisation: Road and Motorways Directorate

2.1.2 Progress since 2014

Description of progress in the area since 2014:

There has been a significant shift towards the sustainability, modernisation and extension of the National Transport Information Centre's functionalities. A National Traffic Information Register has been created with the possibility of standard data exchange relevant to issued European Commission Regulations. In the coming years, it is planned to integrate new data sources into the NTIC as well as to develop and implement new functionalities and upgrade existing NTIC modules so as to modularise the system and reduce dependence on the current system provider when the central core of the system will be ready for connection to new, standardised traffic telematics systems modules.

For telematics elements in data acquisition infrastructure, increasing safety and continuity of traffic, we are modernising by increasing the number or by implementing new modern telematics systems and services. During the monitored period, the following were installed:

- 4 new information portals (PDZ + ZPI) on the TEN-T network, with 82 information portals being upgraded to comply with the internationally recognised system for providing up-to-date traffic information to PDZs and extending them to harmonised pictograms and accompanying texts from the European Mare Nostrum initiative (D2, D5, D8, D10, D35, D46, D55).
- A fixed distance speed measurement system (automatic vehicle check - non-compliance with permitted speed and the option for number plate identification) was installed in upgraded sections of the D1 truck motorway. A tender was launched twice for the supply of an additional 5 systems, but the public tender has yet to be successfully completed for the time

being.

- A total of 12 systems have been installed to monitor and evaluate traffic on the TEN-T network. Automatic Counter Detectors.
- 10 km of motorway has been equipped with an accident or danger warning system to facilitate vehicle communication with other vehicles or intelligent traffic infrastructure. As part of the gradual expansion and distribution of data collection on traffic and weather conditions, 21 weather stations were deployed.

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

(see guidance provided in Member States experts follow up meetings)

Measures undertaken, if any, to set up a national access point and on the modalities of its functioning:

Based on the requirement of EU Directive 962/2015, on the setting up of a Single Access Point (SAP) in the EU Member States it was decided to use the existing National Transport Information Centre (NTIC) already in long-term use, and to extend its existing functionality to these traffic information requirements, complying in particular with Regulations 885/2013, 886/2013 and 962/2015. The first step was the establishment of the National Traffic Information Register (http://registr.dopravniinfo.cz/en/index.html) . This registry lists the sources, providers, source types, formats, and traffic information protocols. The list of sources of traffic information provided in the DDI and DATEX II data formats are listed in Table 1 as the implementation of Regulations 886/2013 and 962/2015.

Provider	Title	Status	Description
National Traffic Information Centre	DDR XML - Běžné dopravní informace	operational	Normal traffic information (accidents, road closures, road works ...) in the whole of the Czech Republic, provided by the NTIC, at the time of their origin, in the DDI NTIC format for normal traffic information.
National Traffic Information Centre	DDR XML - Stupně provozu	operational	Traffic intensity levels in the Czech Republic, provided by the NTIC, at the moment of their origin, format DDI NTIC for normal traffic information.
National Traffic Information Centre	DDR XML - Zimní sjízdnost	operational	Winter conditions in the Czech Republic in the areas managed by the Roads and Motorways Directorate, provided by the NTIC at the moment of their origin, in the DDI NTIC format for winter reporting. Not provided outside the winter season.
National Traffic Information Centre	DATEX II Situation Publication - Běžné dopravní informace	operational	Routine traffic information of a general nature (accidents, etc.), in the whole of the Czech Republic, provided by the NTIC, at the moment of their origin, in the profile of the usual DATEX II traffic information format.
National Traffic Information Centre	DATEX II Situation Publication - Uzavírky a omezení	operational	Planned closures and traffic restrictions, in the whole of the Czech Republic, provided by the NTIC, at the moment of their origin, in the traffic restrictions profile of the DATEX II format.

National Traffic Information Centre	DATEX II Situation Publication - Počasí	operational	Information on the weather and road conditions, throughout the Czech Republic, provided by the NTIC, at the moment of their origin, in the weather profile of the DATEX II format.
National Traffic Information Centre	DATEX II Elaborated Data Publication - Hustota provozu	operational	Traffic density (in terms of traffic intensity levels or traffic status) on the set of predefined positions, in the whole of the Czech Republic, provided by the NTIC, at the moment of their origin, in the density profile of the DATEX II format.
Provider	**Title**	**Status**	**Description**
National Traffic Information Centre	DATEX II Elaborated Data Publication - Dojezdové doby	operational	Journey times for passenger cars and commercial vehicles for a set of predefined positions, in the whole of the Czech Republic, provided by the NTIC, at the moment of their origin, in the DATEX II journey times profile format.
National Traffic Information Centre	DATEX II Predefined Location Publication - Sada předdefinovaných poloh	operational	The predefined positions that are used in status event publications (journey times, traffic density, tunnel status, car park occupancy, etc.) in the Czech Republic, provided on request by the NTIC, in the DATEX II predefined positions profile format.

An English-language version of the registry has also been set up for foreign parties interested in traffic information, see Figure 1.

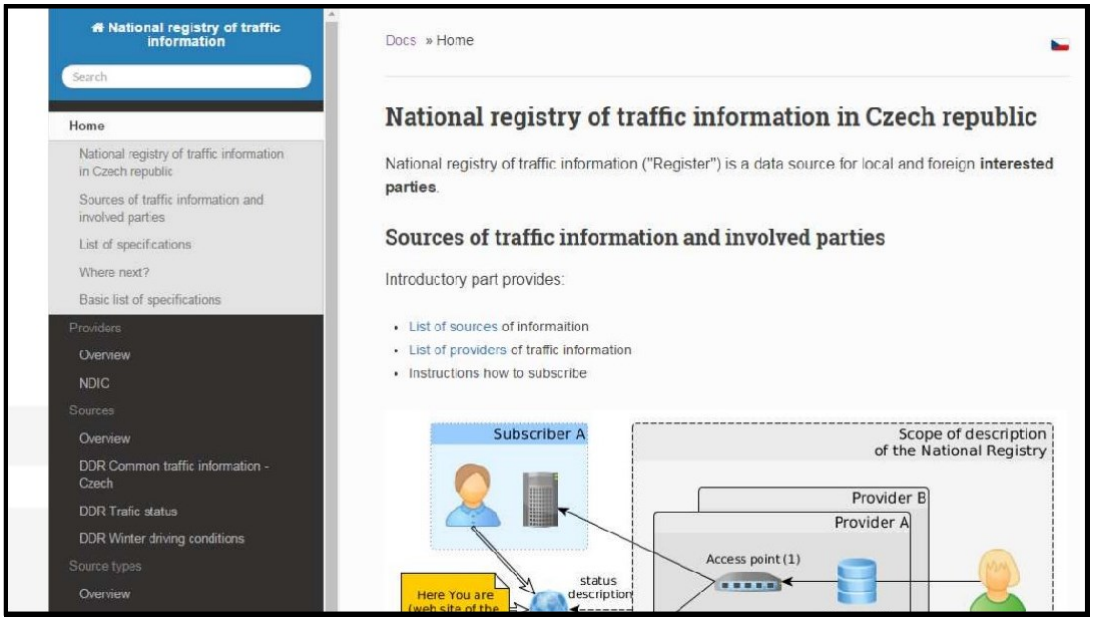


Figure 1 - English-language version of the traffic information registry

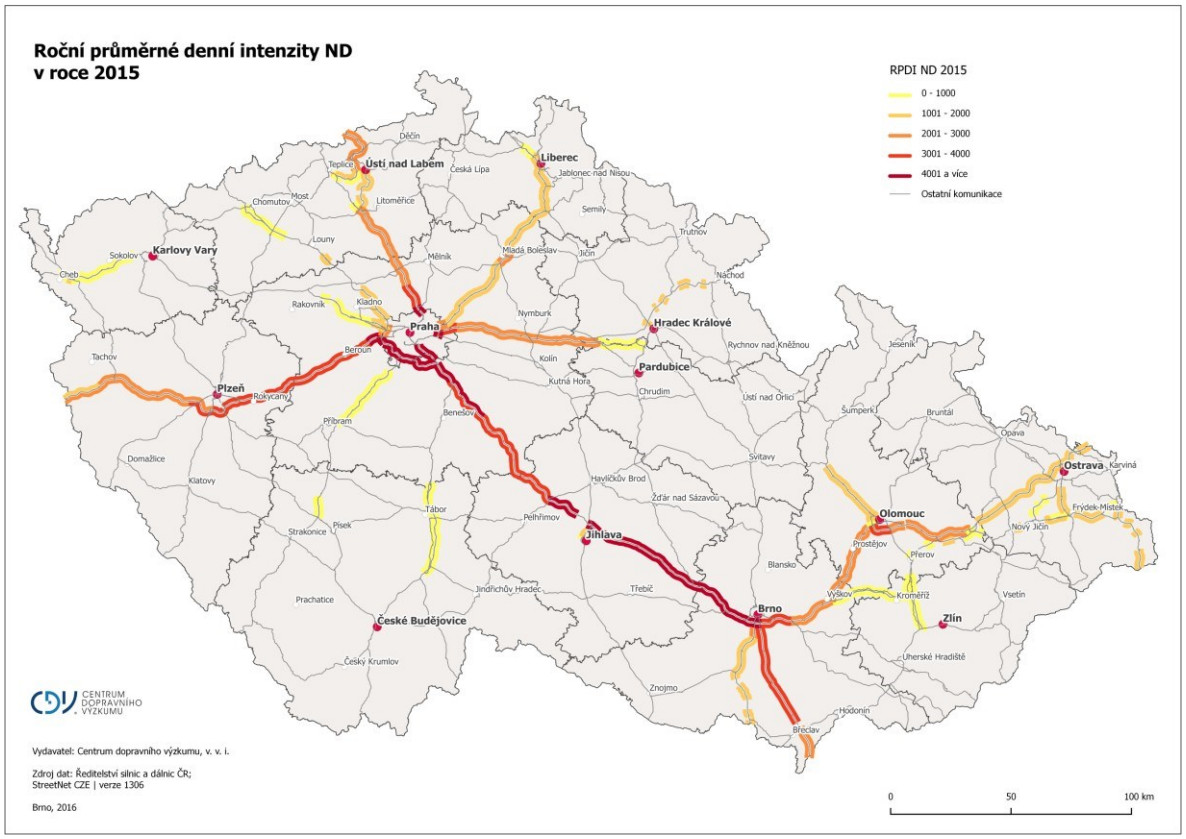
The register is subject to further completion and dissemination of the traffic information provided. One of the priorities is to extend the functionality of the National Registry and to gradually convert the current Data Distribution Interface (DDI) format to the standard DATEX II format.

Where relevant, the list of motorways not included in the comprehensive trans-European road network and identified priority zones:

Based on the requirements of the ITS Directive Regulation, ITS priority areas, i.e. the motorway network segments of the Czech Republic on which the required traffic information and ITS services will be given priority were defined. This definition is the basis for deploying ITS systems and relevant state investment plans.

Freight traffic intensities on the Czech motorway network determine individual priority zones. Priority Zone A is expressed as an annual average daily intensity of 3000 trucks, Priority Zone B is expressed as annual average daily intensity of 1000 lorries, other sections fall into Priority Zone C. Zone layout is subject to ongoing approval.

The proposed objective is to equip sections of the motorway network falling into Priority Zone A with certain ITS services by the end of 2020 (for example, implementation of 885/2013 to equip rest areas on the motorway network with parking occupancy detection systems).



Annual average daily freight intensities - 2015

Figure 2 - ITS Priority Zones by freight traffic intensities on the Czech motorway network (Priority Zone A expressed in red, Priority Zone B in orange and Priority Zone C in yellow)

2.1.4 Reporting obligation under Delegated Regulation (EU) No 886/2013 on data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users (priority action c)

(see guidance provided in Member States experts follow up meetings)

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:

The first step was to determine the availability of static data in the Czech Republic. A questionnaire

on static data was translated, its attributes were interpreted and a request for comment was sent to the private sector as well as to the NTIC and the Ostrava Traffic Databank. The responses received were reflected in the form and presented at the CROCODILE project meetings, see Figure 3.

Name of Participant:Petr Bureš
Country:Czechia
Affiliation:TamTam Research on behalf of ŘSD ČR

Priority Action b data categories (see Annex, parts 2 and 3)								
Annex Parts (1,2,3)	Category	Definition	Available in my country (YES/NO)	Available in my organisation (YES/NO)	Available at (organisation)	Available in Standard (Name_of-Standard) (e.g. DATEX, INSPIRE, GDF	Avaialble in Data Format (Name_of_Format) (e.g. SHP, GDF, GML, XML)	
Part 1.) Static road data	(a)	road network links and their physical attributes, such as:						
	(i)	geometry;	yes	yes	ŘSD ČR/NDIC	ISSDS, ALERT-C	SHP+DBF, CSV	
	(ii)	road width;	yes	yes	ŘSD ČR/NDIC	ISSDS, ALERT-C	SHP+DBF, CSV	
	(iv)	gradients;	yes	partially (only state roads)	ŘSD ČR/NDIC	ISSDS	SHP+DBF, CSV	
	(v)	junctions;	yes	yes	ŘSD ČR/NDIC	ISSDS, ALERT-C	SHP+DBF, CSV	
	(b)	road classification:	yes	yes	ŘSD ČR/NDIC	ISSDS, ALERT-C	SHP+DBF, CSV	
	(c)	traffic signs reflecting traffic regulations and identifying dangers, such as:	yes	partially (only state roads)	ŘSD ČR	N/A		
	(i)	access conditions for tunnels;	yes	partially (only state roads)	ŘSD ČR	N/A	SHP+DBF, CSV	
	(ii)	access conditions for bridges;	yes	partially (only state roads)	ŘSD ČR	N/A	SHP+DBF, CSV	
	(iii)	permanent access restrictions;	yes	partially (only state roads)	ŘSD ČR	N/A	SHP+DBF, CSV	
	(iv)	other traffic regulations;	yes	partially (only state roads)	ŘSD ČR	N/A	SHP+DBF, CSV	
	(d)	speed limits;	yes	partially (only state roads)	ŘSD ČR	N/A	SHP+DBF, CSV	
	(e)	traffic circulation plans;	arification need	no		N/A	-	
	(f)	freight delivery regulations;	yes	partially (as a text)	ŘSD ČR	N/A	-	
	(g)	location of tolling stations;	yes	yes	ŘSD ČR/NDIC	ISSDS	SHP+DBF, CSV	
		identification of tolled roads, applicable fixed road user						

Figure 3: Example of static data form

Furthermore, in the design of approaches to static and dynamic data, a way to cover the required static data resources available in ALERT-C, DATEX II and INSPIRE was explored.

static data types	LT	coverage	level of detail
1. road network links and their physical attributes, such as:			
1. Geometry;	yes	TERN+	chain of X,Y coordinates, and LT attributes
2. road width;	no	-	-
3. number of lanes;	no	-	-
4. Gradients;	no	-	-
5. Junctions;	yes	TERN+	X, Y coordinate, class and linking and description
2. road classification;	yes	TERN+	6 classes
3. traffic signs reflecting traffic regulations and identifying dangers, as:			by ALERT-C road link or point location
1. access conditions for tunnels;	partially	TERN+	by an event code and supp. info and quantifiers
2. access conditions for bridges;	partially	TERN+	by an event code and supp. info and quantifiers
3. permanent access restrictions;	partially	TERN+	by an event code and supp. info and quantifiers
4. other traffic regulations;	partially	TERN+	by an event code and supp. info and quantifiers
4. speed limits;	partially	TERN+	by an event code and supp. info and quantifiers
5. traffic circulation plans;	no	-	-
6. freight delivery regulations;	no	-	-
7. location of tolling stations;	yes	TERN+	X, Y coordinate, class and linking and description
8. identification of tolled roads, road user charges and payment methods	no	-	-
9. location of parking places and service areas;	yes	TERN+	X, Y coordinate, class and linking and description
10. location of charging points for EV and the conditions for their use;	partially	TERN+	only as in 9 (no specific type in LT)

Figure 4: Example of mapping of ALERT-C and required static data

For dynamic data, a selection of appropriate parts of the DATEX II model was performed. In addition, a method for identifying the correct approach to data selection was determined using so-called "User Stories". These can be described in the form "As a *<user>*, I want *<function>* so that *<motivation>*".

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

In order to meet the requirements of Regulation 886/2013, the following projects are being implemented, the report below also sets out the concept plans and projects under preparation:

Integration of new data sources into NTIC - Continuous integration of newly built or as yet not implemented data sources, e.g. integration of telematics from closures on the D1, integration of

tunnel traffic conditions, integration of new weather stations, integration of newly built PDZs, integration of mobile traffic management systems, integration of FCD, integration of data sources (typically in DATEX II format) from neighbouring countries as part of cross-border cooperation, etc.

Main implementation objective: In order to ensure the optimal quality of traffic information in the NTIC, it is necessary to gradually implement the newly built or as yet unimplemented telematics elements.

Implementation deadline: 2016 and currently ongoing
Responsible organisation: Road and Motorways Directorate

Development and implementation of new functionalities and upgrade of existing NTIC modules - Continuous upgrading of existing NTIC modules and development and implementation of new functionalities is necessary also with regard to newly integrated data types and new needs and requirements for the NTIC system, e.g.: NTIC thin client development, development of NTIC for receipt and processing of information from the METIS system, enhancement of the editing system with functions for receipt, processing and provision of data from FCD, upgrading of the model for calculating journey times, upgrading the module for calculating transport intensity levels, upgrade of the analytical part of the INFOBESI information system (accident sites).

Main implementation objective: The completion of the NTIC's conversion to open status and its further development under the NTIC Strategic Development Plan is expected by the end of 2018. Until then, it is necessary to ensure the development of the existing NTIC and related agent systems to cover current operator needs. Where it is technically possible to do so, this development should be done in accordance with the NTIC conversion so that the newly created modules can be incorporated into the open NTIC.

Implementation deadline: 2016 and currently ongoing
Responsible organisation: Road and Motorways Directorate

The ITS Implementation Plan further outlines other plans relevant to 886/2013, which are currently in preparation or are just a concept plan.

- Creating a functional mathematical weather module in the NTIC
- Transmission of information on the presence of persons on line structures for the needs of the integrated rescue system
- Monitoring personal mobility on the basis of mobile carrier signalling data - BIG DATA from mobile networks
- Implementation of vehicle transit detectors
- Cooperative and safety systems for tunnels on motorways and 1st class roads

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

2.2.1 Description of the national activities and projects

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

ONGOING PROJECTS

Mobile information system for traffic constraint locations on motorways and roads in the Czech Republic - currently the system is under tender. An approved project plan under the name "Mobile Line Traffic Management System at Traffic Closure Locations". The project deals with the supply of a mobile telematics system which can be installed in a relatively short time-frame in front of a work zone on roads under the management of the Roads and Motorways Directorate. The system includes mobile PDZs and traffic detectors with an autonomous power supply. The system in question includes central SW, which is equipped with algorithms that respond to traffic in the monitored area and which allows for control, remote supervision and system management. The system will provide the following features as a minimum:

- Transport Harmonisation - Active Traffic Management
- Warning of queues ahead
- Management of traffic diverted onto alternative routes (in locations where this is possible)
- Manual control option

In 2016, a pilot test for Mobile Line Traffic Management System was carried out on the D5, showing a 25% reduction in travel time in critical locations, increased bottleneck throughput of 20% and a 60-70% reduction in frequency and intensity of accidents.

Main implementation objective: The main objective of the mobile system is to manage and harmonise traffic flow, to increase traffic safety and also to ensure that drivers are informed about the status of traffic in the area concerned at critical points of road infrastructure - before and in traffic closures.
Implementation deadline: 2016 and currently ongoing
Responsible organisation: Road and Motorways Directorate

Line traffic management - Currently, the project is under preparation and technical documentation is being prepared for planned implementation on the D1 motorway. The subject of the project is to build a line traffic management system (LTM) on selected sections of the motorway network in the Czech Republic. The first stage will be to add the LTM to parts of the D0 and the connecting D1 and D5 motorways. In 2010, the first LTM system was put into operation on sections of the D0 and D1 motorways. Due to the growing user, technical and functional requirements, this project card will also upgrade and add to the existing LTM functionalities on parts of the D0 and D1 motorways. The project will include, besides the installation of portals with variable traffic signs, the necessary equipment for a control centre.

Preparation of the LTM infrastructure project documentation on the following motorways:

- D1 km 0.00 - 10.00 (beginning of D1 - Modletice flyover, both directions)
- D1 km 10.00 - 21.00 (Modletice flyover - Mirošovice flyover, in direction of Brno only)
- D0 km 23.00 - 28.00 (Třebonice flyover- Ruzyně flyover, both directions)
- D5 km 22.00 - 0.00 (Králův Dvůr flyover - D0 flyover, direction Prague)
- D0/D1 - modernization of existing line traffic management

Main implementation objective: The main objective of line traffic management system is to control

and harmonise the traffic flow, to increase traffic safety and also to ensure drivers are informed about the status of traffic in their direction of travel. **Implementation deadline:** Preparation 2016-2017, implementation 2018-2019

Responsible organisation: Road and Motorways Directorate

Construction of WIM (Weigh In Motion) on motorways - This project is currently in the tendering process. This project proposal envisages the construction and implementation of about 14 bi-directional new WIMs. Specifically, these are located on D3 - 1 unit; D5 - 3 units; D8 - 1 unit; D11 - 2 units; D4 - 1 unit; D6 - 1 unit; D7 - 1 unit; D35 - 2 units; I/35 - 1 unit D46 - 1 unit.
Of these, 4 sites are already being discussed and at other locations there is a check on the capacity of the toll gates.

Main implementation objective: The main objective is to complement the WIM system and protect roads against overloaded vehicles.
Implementation deadline: 2017 - 2018
Responsible organisation: Road and Motorways Directorate

Motorway D1 km 220 - 245 modernization of telematics - in the given project there was reconstruction of the road optical route and the power supply system. There was also reconstruction of the SOS emergency phones using new ones with IP technology and the reconstruction of the camera system, including transport counters. This is a section of the D1 where there were still old SOS emergency phones communicating over metal cable and old cameras and counters.

Main implementation objective: Modernization of telematic systems including SOS emergency phones on the primary D1 motorway.
Implementation deadline: 2017
Responsible organisation: Road and Motorways Directorate

2.2.2 Progress since 2014

Description of the progress in the area since 2014:

New management and information systems are being continuously applied. Pilot and test operation of systems based on science and research projects has been carried out and an attempt is being made to put such projects into real-time operation. Preparatory work has started on the application of new line traffic management segments and modernisation of existing, already completed systems. Work has also focussed on building an optical communications network on the motorway network, which is important for further deployment and implementation of new ITS services (e.g. C-ITS). Further plans will focus primarily on aspects emerging from the European experience with the deployment of the new digital tachograph (165/2014) and other possibilities for non-regulated communications networks and services, such as the Internet of Things, to allow tracking of freight on the motorway network. The results of the Mirošovice-Rudná co-operative systems are also awaited (see below), in terms of their economic and technological feasibility. For this purpose, no further action has yet been taken.

2.3 Priority area III. *ITS road safety and security applications*

2.3.1 Description of the national activities and projects

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

There are no completed projects so far in this area, but implementation and concurrent pilot operation of innovative systems that have significant potential for increased transport safety are ongoing.

ONGOING PROJECTS

Fixed distance speed measurement on D1 - The tender for the supply of this system has been cancelled for the second time. At present, the fixed distance speed measurement operates on one modernised section of the D1 motorway. The aim is to supply the system for 5 sections of the modernisation in both directions, followed by moving to other sections of modernization according to time sequence. The project deals with the installation of the camera system and the necessary components for the detection of vehicle number plates at toll gates and mobile masts with power and communication for the evaluation of fixed distance speed measurement on the given sections of the D1 motorway modernisation.

Main implementation objective: Increasing traffic safety in critical sections of the trunk network, especially in the upgraded sections of the D1 motorway
Implementation deadline: 2016 - 2020
Responsible organisation: Road and Motorways Directorate

Telematic measures to improve traffic safety in climate-sensitive locations - At present, critical locations are being identified and a tender for suppliers will be prepared. Each hazardous location will typically be equipped with a sensor (depending on the specific situation, it may be a radar, weather station, traffic detector), evaluation unit with a remote control option and actuator (most often PDZ or other visual information). This project proposal envisages the implementation of about 50 high-risk sites.

Main implementation objective: Comprehensive equipping of pre-identified climate-sensitive localities on the Czech road network managed by the Roads and Motorways Directorate and adapted to ITS facilities, which will significantly increase road safety in these locations and will lead to a reduction in accident rates.
Implementation deadline: 2016 - 2018
Responsible organisation: Road and Motorways Directorate

Systematic Assistance on Motorways - A free driver assistance service has been available since 2016. The assistance service is provided by Roads and Motorways Directorate staff and operates 24 hours a day, 7 days a week, 365 days a year. The Roads and Motorways Directorate assistance service covers almost 900 km of the following motorways: D0, D1, D2, D3, D5, D8, D11, D46, and part of the D35. The reason for the establishment of the Roads and Motorways Directorate assistance service is to ensure a higher level of safety and continuity of traffic through a service to motorists on selected motorways in the Czech Republic.

The activities performed by the Roads and Motorways Directorate assistance service:

- patrolling
- marking an accident site
- traffic obstacle marking
- marking and providing a solution to the problem of an immobile vehicle
- road surface inspection
- removing a traffic obstacle or arranging its removal
- cleaning of rest areas

Calling the Roads and Motorways Directorate assistance service is possible via the NTIC Call Centre on the 800 280 281 free call line or via a mobile phone app.

Road and Motorways Directorate Call Centre
The central coordinating facility of the system is a non-stop call centre. The call centre ensures effective communication between the passengers of a vehicle requiring assistance and the assisting vehicle by the communications manager or his/her contractual partners. At the same time, the Roads and Motorways Directorate call centre has a direct link to the NTIC via a separate application. The created RDS call centre represents a further distribution channel for traffic information for the public.

Assistance vehicles/service
The core of the system consists of assistance vehicles. Each vehicle is equipped with a tow-hook for a warning trailer - for immediate and effective marking of the traffic obstacle. Vehicles thus deployed are able not only to visibly mark and/or remove a road traffic obstacle, but also to take care of the vehicle's passengers.

This significantly eliminates the risk of traffic accidents due to an abandoned road vehicle or unmarked traffic obstacle. The road traffic obstacle will be duly marked in line with a pre-approved scheme. The Call Centre or the NTIC Interface for the Call Centre, through the motorway IS (Motorway Administration and Maintenance Centres) or the data channel will be used to collect information about traffic obstructions - abandoned or immobile vehicles.

Each of the above-described traffic events entered in the NTIC system will trigger the relevant scenario, and a predefined warning will be displayed on the nearest ZPI before the stationary vehicle. An NTIC event is also automatically sent through a data distribution interface to almost 200 subscribers.

Main implementation objective: Modernization of telematic systems including SOS emergency phones on the primary D1 motorway. **Implementation deadline:** Due to its complexity, the project is divided into 3 phases - pilot launch (planned for the D1 motorway on the Prague - Brno section for half a year to a year); an expanded pilot launch on other overloaded motorway sections to verify functionality and process optimisation, and then deployment in full mode.
Pilot phase Prague - Brno - 2016
Expanded Pilot Phase - 2016/2017
Full Mode - 2017/2018
Responsible organisation: Road and Motorways Directorate

Assistance vehicles with folding PDZ
Since the summer of 2017, the Roads and Motorways Directorate has launched a pilot project on the busiest D1 motorway and on the D2. Vehicles with PDZs are flexible assistance vehicles with variable traffic signs that will inform the public of the formation of queues before sections being upgraded where there is a risk of accidents due to the collision of a moving vehicle with a standing queue during short-term and long-term closures on the motorway network. The service is provided by a supplier.

Vehicles intervene primarily:

- before sections being upgraded,
- before long-term closures,
- before short-term closures,
- before a traffic accident or other emergency on a motorway,
- in places where the number of lanes is reduced.

The process of developing a generic methodology (activation, vehicle placement, monitoring, etc.) is under way.

The service is only activated by a Motorway Administration and Maintenance Centre on the instructions of the NTIC or the Czech Police. After testing, another procedure may be possible in the future. We are also trying to connect with the dynamic information system.

Main implementation objective: The main goal of the project is to warn motorists of the dangers of a queue ahead (before a closure or a traffic accident) as well as to coordinate the whole traffic situation in the surrounding area. **Implementation deadline:** 2016-2017 pilot operations, 2018-2019 gradual expansion of the system.
Responsible organisation: Road and Motorways Directorate

Motorway D2 2.0-60.0 SOS Modernisation - This project is currently in the tender process - The project addresses the modernisation of obsolete SOS emergency phones with new IP technologies. This is a section where there are still old SOS phones communicating over metal cable. It simultaneously deals with the laying of a complete communication optical route and the reconstruction of the power supply network for SOS and camera points on the D2 motorway. This project proposal envisages the laying of an optical cable on the D2 with a length of about 60 km and the modernisation of 30 pairs of SOS emergency phones.

Main implementation objective: The aim is to build new high-capacity communications routes for telematics devices and to modernise SOS emergency phones.
Implementation deadline: 2017
Responsible organisation: Road and Motorways Directorate

In addition to the practical implementation of project plans and the ITS Action Plan and its Implementation Plan, the following activities have been carried out since 2014, including organisational measures and methodological support:

- Evaluation of the effectiveness of measures to increase traffic safety on the roads - methodology
- In-depth analysis of traffic accidents - methodology
- National Road Safety Strategy 2011-2020 and its evaluation for individual years
- Revision and update of the National Road Safety Strategy 2011-2020
- Predictive accident models as a tool for systematic identification of critical road network locations
- Statistical quantification of the impact of risk factors at railway crossings, using predictive accident models
- Determining, evaluating and information decision support for road safety strategies

2.3.2 Progress since 2014

Description of the progress in the area since 2014:

In the period under review, efforts were made to significantly enhance traffic safety through the use of intelligent transport systems. There is a long-standing attempt to implement systems for automatic registration of drivers exceeding the speed limit in critical sections of major roads (fixed distance speed measurement) or in the form of assistance, assistance vehicles with fold-down PDZs, set up a hotline so that intervention agencies can respond in the shortest possible time to collisions and accidents. A number of pilot applications have been implemented, which have proven themselves and will be gradually introduced into normal operation and extended throughout the core network. In addition to the above-mentioned activities, a project is being implemented involving the installation of a large number of warning systems in climatically risky locations. In addition to these activities, SOS emergency phones are being continuously upgraded, including the laying down of new optical and metal cable routes.

2.3.3 112 eCall (priority action d)

National eCall PSAPs Infrastructure ready by 1st October 2017:

Two TCTV 112 (PSAP) centres were adapted to receive and route eCall 112 emergency calls before 1.10.2017.
The contractor will deliver documents on 19.10.2017 to the Directorate General of the Fire Brigade of the Czech Republic, stating that this contract respects the obligations laid down by Delegated Act No 305/2013. A test platform with real-time PSAP functionalities is created as part of the contract.

Authorities that are competent for assessing the conformity of the operations of the eCall PSAPs:

As the conformity assessment does not relate to products but to services (systems), negotiations are ongoing with the Office for Standards, Metrology and Testing (Cz: ÚNMZ) on the legal procedure for the establishment of the nominated ITS conformity assessment body. It is expected that the Transport Research Centre, v.v.i. (Www.cdv.cz) will be assigned as the nominated ITS conformity assessment body.

Additional information:

The Czech Republic is represented by direct partners (Ministry of Transport of the Czech Republic, Telematix, DEKRA, Vitkovice IT Solutions, Fire Rescue Service) in the ongoing I_HeERO international

project. At present, stress tests of the 112 number are under way.

2.3.4 Reporting obligation under Delegated Regulation (EU) No 885/2013 on the provision of information services for safe and secure parking places for trucks and commercial vehicles (priority action e)

1) **Entities designed to assess compliance with established requirements**

As the conformity assessment does not relate to products but to services (systems), negotiations are ongoing with the Office for Standards, Metrology and Testing (Cz: ÚNMZ) on the legal procedure for the establishment of the nominated ITS conformity assessment body. It is expected that the Transport Research Centre, v.v.i. (www.cdv.cz) will be assigned as the nominated ITS conformity assessment body.

2) **National Access Point**

In 2015, a functional prototype of the national registry (so-called National Access Point) was implemented in the form of a static web presentation. The project was implemented under the name *"Implementation of the National Traffic Information Register".* A trial version of the National Access Point, entitled *"The National Traffic Information Register of the Czech Republic"*, which today contains an overview of transport data sources and a list of traffic information providers, was created within the project. The National Register means a register of services providing universal traffic information and a metadata registry. The National Registry is located within the web portal at http://registr.dopravniinfo.cz/ and like the web portal is in two languages (CZ/EN). A default set of three DDI variants (format and protocol) was described in the register prototype:

- DDI - routine traffic information
- DDI - status Information (traffic levels)
- DDI - winter conditions

For the default set of DDI variants, schemes defining the structure of the information supplied were created, proper documentation of the traffic protocol for the collection of traffic information (method of collection, implementation and naming of the chosen method and definition of its parameters) was established. Simultaneously with the registry prototype, an analysis was made of the requirements for this register in respect of its contents, the method of data presentation, the method of register administration. The register prototype meets the basic requirement for this type of search service as required by European Commission Regulation No. 886/2013. The draft requirements for a fully functional register were further elaborated for the prototype. Finally, other datasets were added in DATEX II format, see Table 1 above. The register is thus being gradually completed.

3) **Progress in building secure and protected parking spaces**

The Road and Motorway Directorate of the Czech Republic has completed an analysis of the overall overview of all motorway rest areas. This is for illustrative purposes available in graphical form also in the web application on the Geoportal of the road and motorway network of the Czech Republic: http://geoportal.rsd.cz. The project was implemented in 2015 under the title *"Study of parking space needs incl. passportisation of rest areas on the Czech motorway network"*. In this context, a database of static data on parking in the Czech Republic was created, which was also part of the project named

"*(TB0500MD014) - Implementation of the European Standard DATEX II for the Exchange of Traffic Information*" transformed into the DATEX II format and made available on the European Data Portal entitled "*European Union Open Data Portal*": http://data.europa.eu/euodp/en/data/dataset/etpa.

4) **More information:** based on the results of passportisation of rest areas

- The total number of parking places for trucks on all motorways in the Czech Republic is currently **2,578**. Of which the number of TEN-T parking places is **2,411**.
- The total number of parking areas on all motorways in the Czech Republic where lorries can be parked is currently **120**. Of which the number of TEN-T parking areas is **102**.
- Percentage of parking spaces registered by the information service: **100%**
- Percentage of parking spaces providing dynamic information on the availability of parking spaces and priority zones: **0%**

COMPLETED PROJECTS

Parking space occupancy information system for freight and commercial vehicles on rest areas in the TEN-T network - the project is divided into 4 work packages, which in their final form are to create a basic platform for the subsequent construction of a comprehensive standard information system on the occupancy of motorway rest areas.

1) Static data - PASPORT - Part of passport will be the identification of the readiness of all rest areas on the road network with regard to the installation of telematics and surveillance systems. One of the main outputs is also the creation of a logical data model and the focusing of rest areas at the level of a parking area with a DATEX II interface.

2) Dynamic Data - OCCUPANCY- The main objective of this part of the project is to identify appropriate detection technologies for accurately measuring parking area occupancy, testing them and creating an interface for real-time data provision through the DATEX II interface.

3) Economic aspects and CERTIFICATION - For full and reliable functioning of the system, it is necessary to supervise the quality of the services provided, i.e. to assess the economic and technological aspects of the different detection systems and to propose an investment plan from the state in a hierarchical arrangement so that the deadline for full functionality (full coverage) of the TEN-T network by this service can be established. The investment plan also relates to the technical conditions and possible of equipment/system compliance verification model for occupancy monitoring of rest areas with prediction.

4) Pilot Testing and TECHNOLOGY VERIFICATION - At the selected rest area (Vražné - D1 motorway) we aim to test available technologies and to conduct research on the accuracy, reliability and accessibility of the service. It is intended to test various types of detectors for vehicle entry and exit detection as well as detectors to detect occupancy of parking spaces. Technologies are being explored in terms of the accuracy and reliability of monitoring systems under different weather conditions and for high occupancy rates and shielding of vehicles. This "demonstrator" will be available for regular testing of new, incoming, detection systems. The implementation of the RSU for testing the direct communication of infrastructure with vehicles (C-ITS) is also part of this implementation. This project is further divided into those parts that will be implemented by the end of 2017.

Main implementation objective: The aim is to build a platform for building an integrated occupancy information system for the entire trunk network of the Czech Republic, including the setting of rules for compliance verification. Implementation of the project includes the creation of a demonstrator for verifying the accuracy, reliability and security of detection technologies.
Implementation deadline: 2017
Responsible organisation: The Transport Research Centre, the investor is the State Transport Infrastructure Fund.

The URSA Major Project- URSA CZ- reflects the need for the Czech motorway operator - the Czech Road and Motorways Directorate - to provide specifically for truck drivers real-time high-quality information which is currently unavailable or available only to a very limited extent.

It is essential to collect relevant data through the National Transport Information Centre, to process it, generate reliable information and disseminate it using current distribution channels. It is also important to develop new services focussed on information for truck drivers in a given area. The development of new services will take place in close cooperation with the UMneo project to ensure harmonisation and future interoperability with other Member States' services.

Implementation in the Czech Republic will focus on two main areas: intelligent truck parking and real-time information provision for truck drivers. Both of these services will be deployed on the Czech part of the Baltic-Adriatic Corridor connecting the Adriatic ports in Italy via Austria and the Czech Republic with the Baltic ports in Poland (4 car parks on the D1 motorway near Ostrava were chosen for the project). After successful deployment of the technologies and services, a pilot operation involving extensive testing will be launched in cooperation with the partners of UMneo and with CESMAD BOHEMIA (the Carriers Association). The Carriers Association has expressed an interest in these services and is ready to provide a vehicle test group to monitor the functionality and performance of the system. After the trial phase, recommendations for deploying intelligent truck parking services will be implemented on a larger scale together with recommendations for expanding the coverage of truck traffic information to other parts of the Czech motorway network.

Main implementation objective: The aim of the URSA Czech Republic project is to establish close cooperation with the European URSA MAJOR project, to expand its scope along the Baltic Adriatic corridor within the Czech Republic and, in agreement with neighbouring countries, to develop Czech heavy truck services while evaluating the needs and conditions for organising and directing road traffic in the Czech Republic. This will ensure that trucks coming from Italy through Austria and the Czech Republic to Poland will be provided with the same quality of service, no matter which country a driver is currently in, or which the mobile operator he/she is using.

Implementation deadline: 2017 - 2019
Responsible organisation: Road and Motorways Directorate

The implementation plan also includes a project concept plan, which will be based on the outcome of both of the aforementioned projects.

Providing transport, travel information and other related services to the drivers of freight and commercial vehicles and to carriers - The project aims to set a comprehensive strategy and fully meet the requirements of Regulation 885/2013, in organisational, technical and investment terms.

Additional information: (e.g. has a national access point been set up to provide truck parking data? Does it include dynamic data? What is the source of data (public / private)? Is data published on the European Access Point for Truck Parking hosted by DG MOVE?)

Conversion of rest areas to DATEX II - A table of rest areas on the Czech motorway network has been converted into DATEX II format and published at the European Access Point. This transformation proved to be very complicated due to the fact that not all minimum profile requirements are met in the provided rest area table and also due to the unclear linking of some items to the DATEX II model. These problems were subsequently resolved, however additional changes to the existing table of rest areas can be expected from the results of the project *"Parking space occupancy information system for freight and commercial vehicles on rest areas in the TEN-T network"*. Static rest area data for the Czech Republic are published at http://data.europa.eu/euodp/en/data/dataset/etpa.

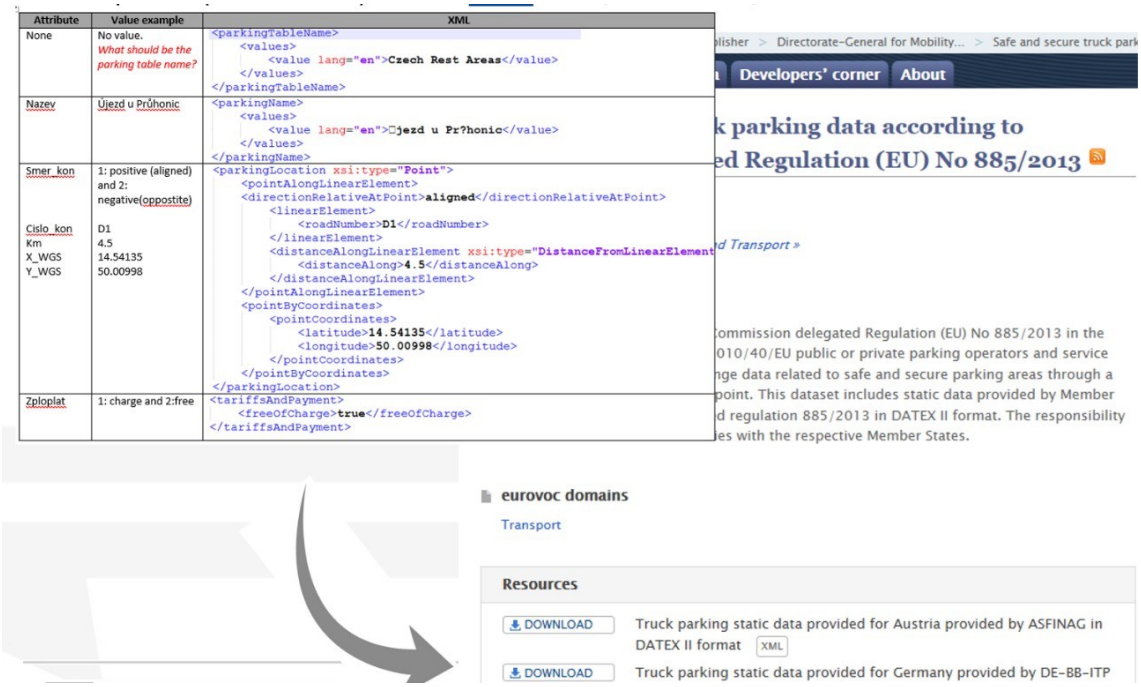


Figure 5 Example of conversion of rest area description into DATEX II

2.4 Priority area IV. *Linking the vehicle with the transport infrastructure*

2.4.1 Description of the national activities and projects

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

The Roads and Motorways Directorate of the Czech Republic is proceeding systematically with the introduction of new technologies, including C-ITS systems. In 2015-2016, initial tests of C-ITS systems were carried out in the Czech motorway environment. These tests and pilots verified the functionality of available technologies, the applicability of the defined applications, the benefits for users under the conditions in the Czech Republic. During these tests the recommendations of the outputs of the BaSIC project (delivered within the framework of the research and development project for the Czech Republic Technological Agency in 2013) and the certified Methodology for the

Introduction of Cooperative ITS systems in the Czech Republic were carried out. Subsequently, the co-operative ITS systems were integrated into the "Intelligent Transport Systems (ITS) Development Action Plan to 2020", which was created by the Czech Ministry of Transport and approved by the Czech Government in May 2015. There followed the creation of the "Implementation Plan for the Intelligent Transport Systems (ITS) Development Action Plan to 2020" and the integration of cooperative ITS systems into this document, which was approved by the Czech government in May 2016, the Czech Roads and Motorways Directorate also had prepared a strategic document "Proposal for an open national ITS corridor platform and its implementation on the part of the motorway network in the Czech Republic (ITS ONP)" within which was defined the so-called ROADMAP for the introduction of C-ITS on motorways in the Czech Republic in individual stages up to 2020.

A contract for the delivery of " **ITS Corridor Mirošovice - Rudná** ", which was defined in the ROADMAP as Stage -1 for implementation of cooperative systems in the Czech Republic, has just been signed and will serve as the basis for building further ITS corridors and cooperative systems in cities. This ITS corridor should be fully operational in Q2 2017. On the motorway section (Prague Ring) between Mirošovice and Rudná (parts of motorways D1, D0 and D5), intelligent communication units have been installed at about 2 km intervals. These devices transmit information to the test vehicle cabins about current traffic signing symbols on the line traffic management portals and traffic information equipment (ZPI) or about journey times on the Prague Ring.

At the same time maintenance vehicles have been equipped with C-ITS units; these are responsible for these motorway sections(Mirošovice - Rudná). In addition to the vehicles, mobile trailers were also equipped, marking short-term work on motorways. Insufficient marking of a work location, combined with driver fatigue, is the cause of a large number of accidents, which unfortunately also have tragic consequences, especially for maintenance workers. Equipped vehicles and trailers therefor now transmit information about their location to their surroundings, for example about lane closures or speed restrictions.

This project is seen as the foundation stone (so-called Phase -1) for future activities in the C-Roads Czech Republic project. As part of this project, the ITS corridor coverage of the Prague Ring will be extended up to the D5 motorway to Pilsen and the D11 motorway to Hradec Králové. Part of the D1 motorway around Brno will also be equipped.

The project is focused not only on motorways. The of Brno, through its wholly owned company Brněnské komunikace a.s., will, in close cooperation with the Czech Roads and Motorways Directorate, set up a systematic approach to the implementation of cooperative systems in the city and create the conditions for their effective deployment. The aim in particular is, to optimise traffic flows in the city of Brno, with special emphasis on trunk and transit routes.

The project will also test the use of C-ITS systems in urban public transport, specifically in Pilsen and Ostrava, where passenger transport companies have committed to providing their vehicles and infrastructure for testing. In the case of Ostrava, a warning will also be tested for drivers coming up to a crossing with an approaching tram, especially on a single-track inter-urban tram track. The results can be used in the construction of tram-trains in the Czech Republic - a system allowing railway vehicles to cross onto tram tracks or for rail vehicles along a track that has mixed features (for example, a railway line running along a village street). At the same time, testing is planned at railway crossings, whereby the Railway Infrastructure Authority has allocated two level crossings in the Pardubice region for this purpose, equipped with security equipment to increase safety and thus

reduce the number of those injured and killed as a result of the collision of a train with road transport by advising vehicle drivers in the near vicinity of an approaching train.

In total, approximately 90 RSU units and 163 OBU units (vehicle units) will be installed. Approximately 360 km of roads and motorways will be fitted with the technology.

2.4.2 Progress since 2014

Description of progress in the area since 2014:

By 2014, several projects focused on C-ITS in the Czech Republic (the BaSIC project) had been implemented and were focused on theoretical preparation for the introduction of new concepts related to C-ITS systems. After analysing all legislative aspects, standards and norms, a practical test of the C-ITS systems on the D5 motorway was carried out to prove the reliability and safety of the use of these technologies in the Czech motorway environment.

Following the successful tests, the project **"Building a Cooperative ITS Corridor on the D0 MIROŠOVICE - RUDNÁ Motorway Section"** was proposed and implemented. This is the section Mirošovice - Rudná (motorway D1 km 11 - km 24 ; D0: km 23 - km 76 (Prague Ring); motorway D5: km 0 - km 5).
– This project was implemented and handed over in the first half of 2017 and was financed by the State Transport Infrastructure Fund (SFDI). This was a project that had as its main objective the testing of the functionality of co-operative systems in real-time operation on a dedicated section of motorway. During the project, 29 RSUs were installed (along the selected section of the motorway, 28 vehicles and 20 pre-warning devices were equipped). The following use cases are being tested in the project:

- Warnings of road works
- Transmission of information to vehicles
- Processing of floating vehicle data (equipped with OBU)

2.5 Other initiatives / highlights

2.5.1 Description of other national initiatives / highlights and projects not covered in priority areas 1-4:

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

COMPLETED PROJECTS

Opening of the NTIS Interface - In 2016, the functioning of the NTIS (Nationwide Timetable Information System - NTIS) was revised in line with the principles of the European Directive on the Re-use of Public Sector Information (the so-called PSI Directive). A very important aspect of this adjustment, i.e. the accessibility and availability of the information system to other entities, will be the sensitive setting and definition of stakeholders' responsibilities in such a way as to avoid a deterioration in the quality of the end-user service which users are currently accustomed to and which is at the European level currently operated under a uniquely comprehensive system. Support for NTIS from the state, in particular the collection of relevant data and its provision to third parties through a distribution interface, was a necessary step towards the stability of the NTIS.

Main implementation objective: Creating an open interface for providing data from the NTIS environment.
Implementation deadline: 2016

Responsible organisation: Ministry of Transport, implementation by Chaps, s.r.o. (administrator of the NTIS)

Certified methodology for implementing measures to ensure tariff cohesion - In 2016, the Ministry of Transport approved the methodology. By implementing a single tariff system in the Czech Railways network with interconnection to the Integrated Transport Systems of the individual regions in the Czech Republic, in line with the proposed methodology, an attractive system should be created for the passenger, offering more high-quality services to the passenger and ensuring a guarantee of fundamental rights and obligations.

Main implementation objective: Creation of a methodical procedure for the creation of a single tariff in the railway environment with connection to the Integrated Transport Systems of the individual regions.
Implementation deadline: 2016
Responsible organisation: Ministry of Transport, implementation by the Transport Research Centre, v.v.i.

ONGOING PROJECTS

Implementation of a system of unified tariff integration in public transport - this is a project that should create a single clearing centre to serve as a financial bridge between individual carriers with account management and the creation of a travel document (ticket) that will be accepted by the individual carriers.

Main implementation objective: Implementation of tariff integration between different carriers in the Czech Republic.
Implementation deadline: 2016 - 2020
Responsible organisation: The Ministry of Transport, implementation by CENDIS, s.p.

Motorway D5 km 5.0 - 56.0 Cable route upgrades - Currently, a tender is under way. The project addresses the laying of a complete communication optical route and the reconstruction of the power network to connect camera points on the D5 motorway. At present only a non-compliant metal communication cable is used. In connection with the laying of an optical cable, the old power cable will also be replaced, sized to meet the new requirements. This project proposal envisages the laying of an optical cable about 50 km long and its use for the connection of telematics devices.
Main implementation objective: The aim is to build a new high-capacity communications route for telematics devices.
Implementation deadline: 2016 - 2020
Responsible organisation: Road and Motorways Directorate

2.5.2 Progress since 2014

Description of the progress in the area since 2014:

In the monitored period, an open interface to the National Timetable System was implemented, which is a comprehensive system of planned timetables for all carriers (integrated transport system, cities, etc.). A certified methodology for the implementation of single tariff integration in rail transport was also established, with connections into integrated transport systems in the regions. These steps are important for the future implementation of regulations for the provision of multimodal information services. Other development activities include the implementation and

expansion of transport telematics systems in the city of Prague. New systems of active preference for public transport vehicles were installed at crossroads, new information portals were built and C-ITS systems were installed in the Těšnovský tunnel. In other cities of the Czech Republic partial telematics systems have also been gradually implemented. E.g. in Ostrava and Karlovy Vary, a uniform card-based check-in system was installed.

3 Key Performance Indicators (KPIs)

***Note*: The EC document on "ITS KPIs for the EU" is to be used for comprehensive definitions of the KPIs and further guidance. The EU EIP Activity 5 report on "ITS Deployment and Benefit KPIs definitions" is a complementary document providing in particular estimation methods.**

KPI will be reported separately by type of road network / priority zone / transport network and nodes (when appropriate).

3.1 Deployment KPIs

3.1.1 Information gathering infrastructures / equipment (road KPI)

Figures to be provided by type of network / zone.

See the attached file "Annex no.1 – Maps"

Figures to distinguish fixed and mobile equipment.

KPI to be calculated by type of network / zone (when relevant).

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

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

3.1.2 Incident detection (road KPI)

Figures to be provided by type of network / zone.

KPI to be calculated by type of network / zone (when relevant).

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

  On the core network, automated incident detection systems have been installed, especially in tunnels and on the upgraded sections of the D1 motorway, using portable camera systems with automatic incident detection.

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

Objects – incident detection	**km**
Tunnels in non built-up areas	8.5
D1 - upgraded sections	48.2
Total	56.7
Motorways - Total	1,222.7
Share	**4.6%**

3.1.3 Traffic management and traffic control measures (road KPI)

Figures to be provided by type of network / zone.

See the attached file "Annex no.1 – Maps"

KPI to be calculated by type of network / zone (when relevant).

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

Line traffic management is used on the Prague Ring D0 and on the D1 motorway (from the Mirošovice exit).

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

Line traffic management is implemented on 4.5% of the core motorway network.

Line traffic management	**km**
D1	21.0
D0 - Prague Ring	34.0
Total	55.0
Motorways - Total	1,222.7
Share	**4.5%**

3.1.4 Cooperative-ITS services and applications (road KPI)

Figures to be provided by type of network / zone.

KPI to be calculated by type of network / zone (when relevant).

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

Currently, C-ITS services are installed on 70 km of the core road network (20 pre-warning devices - mobile trailers).

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

C-ITS are installed on 5.7% of the core road network.

Cooperative systems	**km**
C-ITS equipment	70.0
Motorways - Total	1,222.7
Share	**5.7 %**

3.1.5 Real-time traffic information (road KPI)

Figures to be provided by type of network / zone / node.

See the attached file “Annex no.1 – Maps“

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

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

109 Traffic Information Devices (ZPI) are installed on the core network in the Czech Republic. 120 PDZs (11 weather PDZs) are installed on the Czech core network. Currently, 11 LED information trailers are used to inform drivers on the upgraded sections of the D1 motorway; these serve as a temporary substitute for information portals.

The Road and Motorways Directorate provides all current traffic reports via DDI using the Alert-C, RDS-TMC formats. This information is provided automatically to navigation and RDS systems. It is built as part of the NTIC, a 24/7 call centre that provides voice information to drivers on a hotline.

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

The RDS-TMC system is implemented on 100% of the core network via report to the radio, navigation systems, and contract partners.

The core network is roughly 60% covered by information portals that are located before exits from motorways.

LED information trolleys are used for approximately 48 km of upgraded sections of the D1 motorway, which is 4% of the core road network (1222 km in total).

3.1.6 Dynamic travel information (multimodal KPI)

Figures to be provided by type of network / zone / node.

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

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

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

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

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

3.1.7 Freight information (multimodal if possible or road KPI)

Figures to be provided by type of network / zone / node.

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

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

At present, we provide:

- static information on all rest areas on the core road network. Information is published on the European Access Point in DATEX II format
- Dynamic information is not yet provided. Activities related to the implementation of a system providing dynamic information on the actual occupancy of rest areas are being implemented. The system will be implemented from the beginning of 2018.

A system for short-term prediction of occupancy of rest areas based on input data from the toll system is currently in test operation. This system will be gradually augmented with information on the occupancy of particular rest areas.

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

Transhipment sites for combined mode transport do not fall within public service.

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

Static information on rest areas, the number of parking spaces and on services is provided from 100% of the core road network.

Dynamic information on the occupancy of motorway rest areas is currently provided from 0% of the core road network.

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

At present, approximately 60% of transhipment sites for combined mode transport are covered in the Czech Republic by information services.

3.1.8 112 eCalls (road KPI)

n.a. – will be provided through the COCOM 112 questionnaire

3.2 Benefits KPIs

3.2.1 Change in travel time (road KPI)

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

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

The calculation methodology is currently being prepared. The input data into the system are connected to the implementation of the system for continuous traffic flow dynamics monitoring (abbreviated to FCD). Within this project, a system supplier has been selected. The system will be implemented by 03/2018. The system will provide comprehensive journey time data for Czech motorways, dual carriageways and 1st category roads.

3.2.2 Change in road accident resulting in death or injuries numbers (road KPI)

Results shall be provided / aggregated at national level to be representative enough. If possible, distinction can be made between accidents resulting in deaths, serious injuries or slight injuries.

At present, it is not possible to determine the benefit of specifically applying the ITS system to safety. When assessing a traffic accident it is crucial to determine the cause. The causes of traffic accidents are listed and categorised in the Czech Republic's traffic police statistics. It is not possible from this information to assess whether a driver would have adapted his/her speed and thus prevented a traffic accident if, for example, he/she had received information from a weather report on icy conditions.

Nevertheless, within the Operational Programme Transport, calls for development of ITS on motorways and 1st category roads and in cities were announced. Within these calls, project proposals and their evaluations must state whether they contribute to increased safety or to reduced CO2 emissions, etc.

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

- Number of road accident resulting in death or injuries before ITS implementation or improvement:

- Number of road accident resulting in death or injuries after ITS implementation or improvement:

3.2.3 Change in traffic-CO2 emissions (road KPI)

Routes / areas where ITS has been implemented or improved should be specified. Length along / area within which the change in CO2 emissions is calculated should be long / wide enough to be representative.

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

The methodology for calculating these parameters is currently under preparation.

3.3 Financial KPIs

ITS includes any types of systems and services altogether.

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

	2015 - Actual		2016 - Budget	
	CZK thousand	EUR thousand	CZK thousand	EUR thousand
Telematics - investments (including tolls)	**379,673**	**13,916**	704,833	**26,073**
Investment expenditure on road infrastructure from the SFDI	19,926,000	730,345	20,293,900	750,708
ITS investment share of total investment	**1.91%**		**3.47 %**	

Annual operating & maintenance costs of road ITS (in euros per kilometre of network covered):

	2015 - Actual		2016 - Budget	
	CZK thousand	EUR thousand	CZK thousand	EUR thousand
Tolls - Supplier non-investment costs	2,458,710	90,119	2,578,426	95,381
Tolls - normal operations	110,000	4,032	140,000	5,179
Telematics - normal operations	160,000	5,864	170,000	6,289
Telematics - total operation and maintenance	**2,728,710**	**100,015**	**2,888,426**	**106,848**
Motorways + 1st category roads (km)		7,480		7,030
Specific operational expenditure on telematics (EUR/km)		**13,370**		**15,199**