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Analysis of Member States reports

Accompanying the document

Report from the Commission to the European Parliament and the Council

Implementation of Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport

{COM(2019) 464 final}

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Directive 2010/40/EU

A - ANALYSIS OF 2014 REPORTS ON NATIONAL ACTIVITIES AND PROJECTS

1. INTRODUCTION

The present document summarises the analysis of the national progress reports of 2014[1], provided by the Member States as per Article 17(3) of Directive 2010/40/EU[2].

The guidelines for reporting, adopted as Commission Implementing Decision of 13.7.2011[3] indicate that "The reports to be provided under Article 17(3) of Directive 2010/40/EU, hereinafter referred as 'the progress reports', should follow the same structure as the initial report and should highlight the progress made since the previous report."

This analysis takes also into account reports received in 2014 and 2015 regarding the implementation of the already adopted specifications for the priority actions of the ITS Directive and the reports provided under the eCall Decision No 585/2014/EU.

This summary constitutes an overview of these national reports, based solely on their content and on the Commission's understanding of these reports. It includes examples and highlights on the implementation of the different specifications adopted under the ITS Directive. Further specific analysis of the implementation of the related Regulations and of the eCall Decision may be carried out as necessary.

2. GENERAL OBSERVATIONS

Twenty-nine national progress reports have been received (28 Member States and Norway[4]). Approximately half of them did meet the deadline of the 27 August 2014. Reception of the remaining reports spanned until September 2015, therefore this analysis gives a picture of a relatively wide period.

Many reports provided some figures on past and future investments in ITS research and deployment, or on equipment and operating costs, or on the number of equipment or on project costs. Several reports mentioned extensive figures and/or detailed maps (e.g. Czech Republic, Germany, Hungary, Poland, United Kingdom), sometimes only at project level, and in the absence of a general framework for those figures, it was however not always easy to interpret and compare them or to see the evolution since 2011. In this respect, as already stated for the 2011 reports, the availability of comparable performance indicators and percentages would have facilitated a benchmarking and monitoring of ITS deployment across Europe.

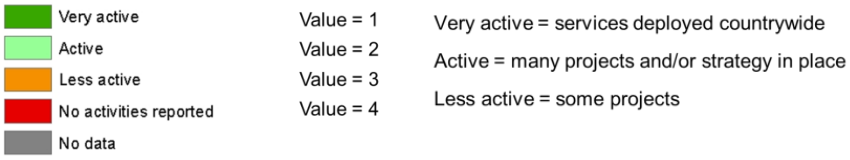
[1] http://ec.europa.eu/transport/themes/its/road/action_plan/its_national_reports_en.htm
[2] OJ L 207, 6.8.2010, p. 1
[3] OJ L 193, 23.7.2011, p.48

[4] Norway's 2014 and 2017 reports have been shared by Norway on a voluntary basis, and are taken into account in the following analyses.

3. DETAILED ANALYSIS

In general the national reports provided a good overview of the Member States' (best) practices. In comparison to the situation reported in 2011, the analysis shows a general progress in all four priority areas. Unsurprisingly, all of the Member States that had already taken action in the development and deployment of ITS prior to the adoption of the ITS Directive have continued to be very active and advanced. Other countries having reported less activity in 2011 reported in general more activities in the 2014 reports.

The analysis of the national reports was structured along the four priority areas of the ITS Directive. The level or intensity of activity in each of the four priority areas was assessed on the basis of the information contained in the reports with a detailed comparison of the progress reported in 2011. This assessment resulted in the development of 8 European colour coded maps reflecting the Member States' level of activity in each priority area in 2011 and 2014, based on the following codes and definitions:



These maps have the objective to highlight general trends in terms of level of activity and evolution thereof from 2011 to 2014 for each priority area of the ITS Directive rather than trying to reflect very accurately the detailed situation in each individual Member State.

Across the four priority areas it can be assessed that progress has been made in all areas in comparison to 2011 with a consolidation of Member States' activities in priority areas I and II, a catching up in area III and emerging activities in several Member States for priority area IV.

3.1. Priority area I: Optimal use of road, traffic and travel data

As stipulated in Annex I of the ITS Directive, priority area I is specifically focused upon the availability, accessibility and exchange of public and private road, travel and traffic data used for multimodal travel information, real-time traffic information services and digital maps.

Activities in **priority area I** are the most documented in the reports, as illustrated in figure 1. Most of the provided examples relate to the development of national journey planning services which exist in a number of Member States. In most cases, the inclusion of dynamic data is still limited. Reports include information regarding national operations, only limited examples of cross-border services in Europe have been reported. A number of Member States have reported activities regarding Open Data but highlighted this is still limited for fare and ticketing data. Progress is also noted in several Member States with regards to the development and uptake of DATEX II for road and traffic data. Examples of interesting initiatives (not exhaustive, in alphabetic order) and evolution since 2011 are listed hereafter.

2011 **2014**

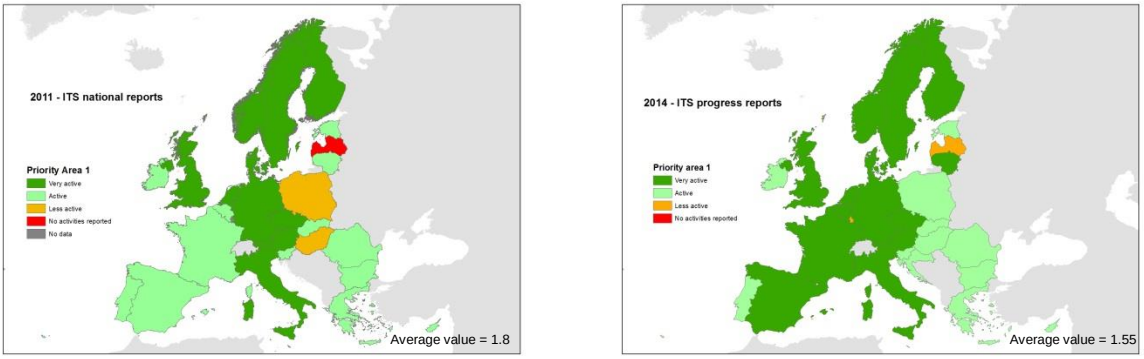


Figure 1 : Priority Area I – Evolution 2011-2014

In **Austria,** a number of activities have been undertaken including integrating traffic information displayed in route planners (ASFINAG, ÖAMTC, VOR, etc.), providing information to to travellers on trains position, number of trains in service and the next stops of a given train (ÖBB Zugradar), provision of journey planners including public transport, cycling, walking and motorised individual traffic (AnachB) as well as providing 'on trip' information (including traffic information) and digital maps (Basemap Austria).

In **Belgium**, public transport providers share schedules and real-time data to optimise waiting times and connections. Real-Time travel times will be available for the road network by 2017.

In **Cyprus,** a real-time traffic information service was developed that is provided freely to the public via the website www.traffic4cyprus.org.cy.

In **Czech Republic**, several detailed maps showing the deployment of different ITS services at national level (traffic information, CCTV, dynamic traffic control, road weather systems, VMS, weight-in-motion etc.) are available on the Czech Space Portal[5]. Czech Republic also reports extensive lists for deployments of road related ITS infrastructure and, under the construction of a new eRDIS content management system, an automatic voice traffic information system has been tested, for motorways and expressways, to provide, by 2015, traffic news via all channels of distribution using ITS.

In **Denmark,** a new traffic information ITS systems has been deployed along many key motorways. A traffic and travel information service, Travikinfo, is available.

In **Estonia,** a national road registry has been developed and the road information centre has been upgraded to handle dynamic traffic signs. The nationwide travel planner has been upgraded supported by a Utris database which offers public transport travel information. Public transport stops are being upgraded with real time information.

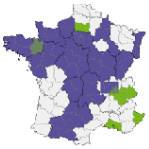
In **Finland,** a new service called "sujuva" was deployed in 2014 that produces real-time traffic information that covers 5600 km of roads and the information is based on anonymous positioning through mobile devices. The data is available via digitraffic.fi. A new service

[5] http://www.czechspaceportal.cz

called liikennetilanne.fi (traffic situation) combines information collected from traffic onto one map base. The service was deployed in the beginning of 2014 with internet and mobile applications. The service offers information on disruptions of road traffic, on road works, weather and road conditions, traffic flows, camera pictures and weight limitations caused by frost heave.

In **France,** the "Tipi" information system will be the unique access point for the road operators' data on the whole national network providing data in DATEX II. France will also set up a national access point listing all service providers and the characteristics of their data (content, geographical coverage, access conditions).

The coverage of regional Multimodal Information Systems was almost completed between 2011 and 2014.



2011

2014

In **Germany,** a mobility data marketplace has been established and foreseen as the single point of access for Germany in terms of the delegated regulations for b), c) and e). Guidelines have been established for the area-wide collection of traffic related data and events: The guidelines are expected to be finalised beginning of 2015, implementation until end of 2015. A quality management system for the collection and processing of data for ITS services has been established.

In **Hungary,** the uptake of DATEX II for real-time traffic information systems is well documented.

In **Ireland,** a cross-border intermodal journey planner covering both the Republic of Ireland and Northern Ireland is available on line at www.transportforireland.ie. It includes information on arrivals and departures in real time, fares, taxis and a cycle planner, as well as a dynamic map of all public transport services in Ireland. In terms of Real Time Passenger Information (RTPI), the system continues to be developed throughout the country, with signs operational in the Greater Dublin Area and other larger cities.

In **Italy,** a database relating to traffic and mobility data and a public Institution Index of information on infrastructures and traffic (IPIT) has been established.

In **Latvia,** a traffic information service (ww.lvceli.lv) has been established.

In **Lithuania,** a multimodal public transport journey planning database system (VINTRA) has been established and has been adapted to integrate RTTI requirements.

In **the Netherlands,** data on traffic (including parking) and on public transport are made available through the national data warehouse (NDW) for motorways/highways/urban-through-route traffic information, the national data project for public transport (NDOV), and through regional initiatives such as (cities) Open Parking Data, or Open Data FWD. The MMRI project related to multimodal travel information has stimulated 5 journey planners providing real-time information. For standardisation, platforms such as MOGIN (discussion

platform on MObility and Geo Information in Netherlands), BISON (open platform on national information standards for public transport travel info), DVM Management Exchange (open platform on open standard for dynamic traffic management) are used.

In **Norway,** the development of a new system to integrate interfaces for traffic operators in TMC is being planned. The NPRA operates an existing traffic information service which includes traffic safety information. A national public transport schedule database, including a register of stops has been established. A timetable for a country-wide travel planning for all types of scheduled public transport is being planned. A road weather information system (Vegvear) has been implemented and is under continuous development. In February 2014 the NPRA started using DATEX II as the standard exchange format for RTTI.

In **Portugal,** a National Data Warehouse with a web platform based on EU standards (Alert-C, RDS-TMC, DATEX II) is currently being established. Multimodal travel information on public passenger transport is established with 3 websites in operation at national level and the metropolitan area of Lisbon.

In **Slovakia,** a central technical register of road data shall be provided by the Ministry of Transport, Construction and Regional Development and operated by the Road Administration through the Road Databank. A Traffic Reporting Service Information System (TRS IS) has also been established.

In **Spain**, Seasonal Traffic Management linked to the summer crossing of foreign vehicles.

In **Sweden,** a RDT database for traffic regulations and rules has been established. It is connected to a digital map of the Swedish National Road Database. A technical platform (oppnadata.se) for publishing open data has been developed.

In the **UK,** many transport datasets have been published (NaPTAN i.e. 350000 transport access nodes in GB, rail timetables, roadworks data covering 90% of England, bus timetables in GB PRM data, next buses API and in the future rail real-time information from the national rail Darwin API etc.). The metadata search and discover facility that is part of data.gov.uk and which is already used for the INSPIRE datasets should be used for the datasets made available under the ITS Directive priority actions. Strong regional activities (Scotland, Northern Ireland, Wales) on RTTI and travel information /journey times delivering through VMS, web, apps, RSS feeds, twitter, internet radio service.

An interesting evolution took place in UK in September 2014, stemming from the new accessibility of transport datasets: as the Open Data Strategy for Transport was very successful and triggered many new apps, the state-funded Transport Direct was stopped, private services based on these datasets being judged henceforth sufficient.

Preparation of specifications pertaining to priority actions referred to in point (a)) of Article 3 of the ITS Directive[6]

When the national reports were submitted in 2014 it was clear that a lot of preparatory work for this priority action has been achieved with many examples of practical projects or

[6] Specifications pertaining to the various points of Article 3 of the Directive will be referred to in shorthand hereafter as "specifications (a)", "specifications (b)"etc.

institutional frameworks used at national level that are addressing some of the challenges to be overcome in this priority area, including opening up access to travel data, developing local and national journey planning services.

At the time of writing, the technical specifications are currently being developed with experts nominated by Member States and it is known that further advancements have been made including activities related to national data standardisation and the provision of linking national and regional travel information services.

Highlights on the implementation of specifications (b)[7]: the provision of EU-wide real-time traffic information services

Member State National reports show implementation procedures, for the provision of real-time traffic information, already being addressed, although differently in shape and pace across Europe.

Two of the most developed approaches branch from the Netherlands and Germany. Both the Mobility Data Market Place in Germany or the Netherlands National Data Warehouse provide interfaces to integrate and re-use different types of data, making it then available for e.g. radio broadcasters, navigation systems and app-developers.

In 2013, Real time traffic data became available as open data in the Netherlands National Data Warehouse database, followed by the status data, in 2014, which describes the current traffic situations.

The United Kingdom proposes to use the existing Government metadata search and discovering facility, a repository hosting data in native directories and allowing for comprehensive search capability, available to the whole UK public sector as well as to private organisations that wish to register their metadata for access by third parties.

Sweden and Austria show increasingly interest on the topic of access to data, seen as an enabler for the development of new applications, e.g. taking into account the UK example. Sweden has created a platform for Open Data. Smart phone App UNTERWEGS in Austria provide on trip information, including traffic information while driving and the ÖAMTC Smartphone App provides information on Park&Ride facilities, public car parks (prices, opening hours and number of available parking lots) and traffic situation.

More classical approaches, based on their National Traffic Management/Control Centers, are then presented across several Member States for the provision of RTTI on the main road corridors, along motorways, such as the Czech Republic, Lithuania, Poland, Greece or Spain.

Under the concept for "a Connected Island to provide better urban and inter-urban connectivity" Malta presented a 2 phase project, MODUS, to be implemented in selected road sections, nationwide and across all modes of land transport and road users. It includes the definition of procedures for the provision of EU-wide real time traffic and travel information

[7] Commission Delegated Regulation (EU) 2015/962 of 18 December 2014 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services - OJ L 157, 23.6.2015, p. 21

services, addressing notably the provision of traffic information services by the private sector and the provision of traffic regulation data by the transport authorities.

Highlights on the implementation of specifications (c)[8]: data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users

21 Member States presented reports specifically addressing the implementation of priority (c), while 4 other Members States referenced it their national reports under the ITS Directive.

Initial feedback reflects Member States' broader acknowledgment and understanding of the specifications implementation principles, allowing for some ruling flexibility, which leads on to a variety of approaches.

Regarding the designated national body for the assessment of compliance, Finland and Sweden plan to designate self-governing National related Transport Agencies, while the majority of the other Member States recognise those competences to fall within the Ministry of Transport, often (Czech Republic, Denmark, France, Norway or Spain) within departments different from the ones actually providing the information within the overarching Ministry of Transport, as to ensure independence and impartiality.

An interesting example comes from the Republic of Croatia stating to be following a consultation with the neighbouring Member States, for the possibility of appointing a joint body.

So far, 17 Member States have already designated their National Body, or plan to do so shortly.

As far as national access points are concerned, there seems to be an understanding across several Member States (e.g. France, Hungary, Italy, Lithuania) to reuse the organization in charged with Traffic Management.

Also accordingly to point 2 in Article 10 of the Delegated Regulation No 886/2013, Member States are asked to provide reports on the progress of the specification implementation.

In this respect, most Member States already show evidence to provide DATEX II compliant information on a full list of road safety-related events or conditions at the designated national access, or via DATEX II nodes, both in public and/or private road operators, therefore able to exchange the data they collect and making it available.

As an example between two neighbouring countries, Spain, via its national body, DGT, uses DATEX II as the standard format for exchange of traffic management information, while in Portugal, despite no national body was yet assigned, all the 16 private road concessioners use DATEX II nodes for exchange data in compliance with EU Regulation.

Finally, Member States show little progress on the assessment of compliance with requirements, due most probably to the still very early stage of implementation.

[8] Commission Delegated Regulation (EU) No 886/2013 of 15 May 2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users - OJ L 247, 18.9.2013, p. 6

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

As stipulated in Annex I of the ITS Directive, priority area II is specifically focused upon the provisions to support traffic and freight management services including traffic information/management control centres, ITS framework architecture, tracking and tracing of freight, integrated multimodal ticketing.

Some reports provide interesting elements with respect to **priority area II** such as work undertaken on the setting up national traffic management control centres and also urban control centres. Regarding ticketing, some efforts have been made by Member States in the field but as efforts in priority area 1 have shown, most of the efforts are concerned with information and planning. Reporting on activities regarding ITS application for freight is limited. Examples of interesting initiatives (not exhaustive, in alphabetic order) are listed hereafter.

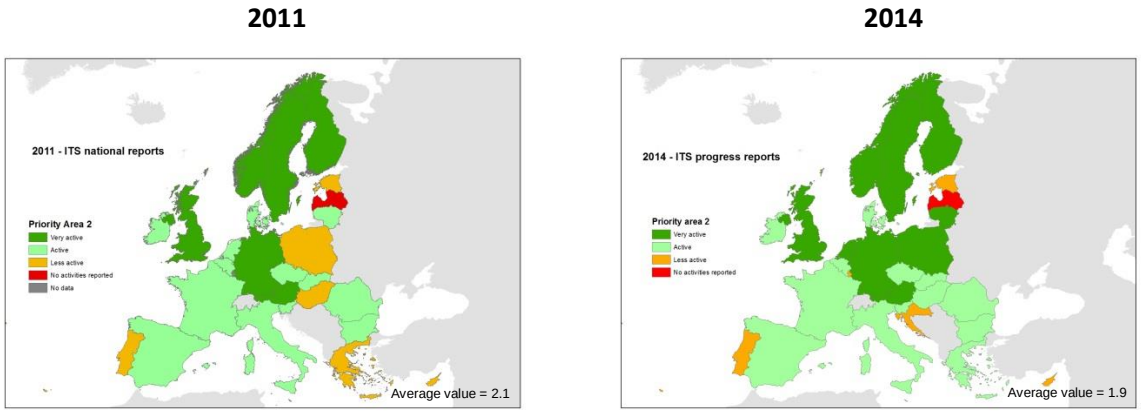


Figure 2 : Priority Area II – Evolution 2011-2014

In **Belgium,** a nation-wide integrated ticketing system for public transport and rail has been established (MOBIB).

Czech Republic has deployed an extensive amount of road related ITS infrastructure along core motorways in the country including emergency stations, rotating cameras, looping on-road sensors for permanent automatic traffic counts, roadside weather stations, variable message signs and electronic security systems in bridges. Participation in the POSSE project is reported, fostering the use of open specifications and standards for traffic management (together with German OCA, and English UTMC), and a project on enhancing the use of parking capacity for HGV on motorways using predictive models

In **France**, a blueprint for dedicated lanes for buses (and possibly other modes like car-sharing, taxis or electric vehicles) has been developed on the national road network in the Ile-de-France region.

In **Germany,** an ITS framework architecture for public transport has been established and recommendations have been elaborated for four identified areas: 1) quality management for

information logistics in public transport, 2) passenger information in public transport; 3) incident management in public transport and link to individual transport; 4) electronic, multimodal and interoperable ticketing system for public transport.

In **Greece,** the Athens Traffic Management Center (TMC) is operational and controls the use of use of variable message signs and interventions in the signal control strategies.

In **Ireland,** an Integrated Smart Card Ticketing known as Leap Card is expanding rapidly with over a half of a million sold of which nearly 100.000 are student tickets. The service has been expanded to Cork on a pilot basis and will soon be available in Galway, with further cities in the horizon. NTA is in the process of procuring a supplier for the required Near Field Communications interface to support the use of mobile phones to read Leap Cards and top them up.

In **Lithuania,** activities such as automated traffic light management systems, electric queue management systems are under operation and a Traffic control and enforcement system based on Automatic Number Plate Recognition (ANPR) cameras is under preparation.

In **Malta,** the definition of an ITS framework architecture for urban transport mobility, including an integrated approach for travel planning, transport demand, traffic management, emergency management, road pricing, and the use of parking and public transport facilities is currently being elaborated.

In **Poland,** the National Traffic Management System (NTMS – KSZR) project involves the use of intelligent transport systems in the area of traffic management on national roads.

In **Spain,** Traffic Management Centres have been set up.

In **Slovakia,** telematic systems on motorways and expressways and ITS in regional and larger towns in Slovakia have been established to support the removal of road infrastructure collision points through the use of intelligent transport systems; structural solutions giving preference to public transport vehicles (reserved lanes, preference at crossroads etc.) and technical solutions in support of traffic flow and safety (monitoring systems, intelligent crossroads systems, variable traffic signs etc.).

In **Sweden,** activities and deployment of dynamic lane management and incident management, and variable speed limits in urban areas, and traffic management plans in vicinity of big cities are documented.

In the **UK,** it is documented that there are 3000 VMS on the highways. Motorway Incident Detection and Automated Signalling (MIDAS) solution has been shown to reduce rear end accidents by around 7% and this has resulted in a 13% reduction in serious injuries related to such incidents. The UK is also very active in the field of ‘Smart Motorways’ utilising data collection and traffic management technologies to make better use of existing road space, reduce congestion and add capacity, by using variable speed limits, dynamic use of the hard shoulder as a running lane at busy times, and on newer schemes, permanent conversion of the hard shoulder to a running lane.

3.3. Priority Area III: ITS road safety and security applications

As stipulated in Annex I of the ITS Directive, priority area III is focused upon activities related to eCall and the data exchange between vehicles and emergency call response centres, safety of Human-Machine-Interface, use of nomadic devices, security of in-vehicle communications, measures to improve the safety and comfort of vulnerable road users for all relevant ITS applications, advanced driver support information systems and the availability and exchange of truck parking information and reservation data.

The vast majority of Member States report activity for **priority area III**, and many focused on the (preparation of) deployment of eCall and to a lesser extent services for safe and secure parking for trucks and other commercial vehicles. Most reports mention only the provision of information and far less activity is reported on the reservation of parking places. Some reports mention bicycle parking while others install alcohol-locks (voluntarily or mandatory) and enforcement systems such as weight-in-motion. Examples of interesting initiatives are listed hereafter.

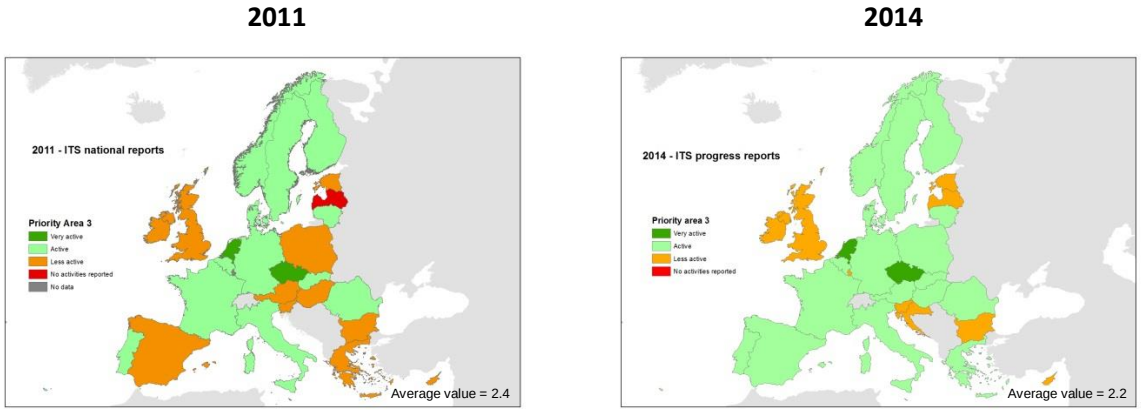


Figure 3 : Priority Area III – Evolution 2011-2014

Belgium has conducted first eCall field tests in 2013/2014.

In **Bulgaria,** the interoperability of the 112 eCall centre in Sofia with Belgium, Croatia and Romania has been tested successfully.

In **Croatia,** establishment of the eCall system and information services for safe and secure parking for trucks and commercial vehicles and the corresponding reservations system.

In **Denmark,** traffic information (traffic density, present and predicted travel time, average speed) and management systems (variable message signs used for warnings and speed harmonisation) are present on ever more roads.

Estonia plans automated traffic surveillance and accident management system upgrades. Initiatives to share private parking lots and secure bicycle parking, bike sharing and charging electric bicycles.

Finland participated in the HeERO 1 project for testing eCall. The NOSCIFEL programme exchanges secured information on goods transport and logistics.

In **France,** the provision of information services for safe and secure parking places for trucks and commercial vehicles is envisaged for the whole national road network.

Germany invested 175Mio € in traffic management systems and is progressing with eCall deployment. Up to 200km of roads will be equipped with Truck parking guidance systems.

Greece plans actions on the provision of information of road safety related information to motorists and the deployment of the eCall system is underway.

Hungary reports work on Static & Real-Time Information Services for parking systems on Trans-European Transport Networks (TEN-T) corridors and the build-up of eCall base infrastructure.

Italy is developing the national eCall system and ITS systems for the management and monitoring of dangerous goods.

Latvia considers the implementation eCall as a high national priority.

Lithuania worked on technical specifications for final eCall installation.

Luxemburg plans a computerised system for one parking area.

Malta observes guidelines for parking services.

The **Netherlands** completed HeERO 1 harmonised eCall pilot project. Weight-in-motion, AOS (anti-accident), Secure Lane (camera tracking) and DRIPS (dynamic route information panel) systems reported large benefits for society.

Norway plans to deploy the pan-European eCall service as of 1 January 2017 and 32 new rest places are to be built in 2014-2023.

In **Poland,** 17 centres of rescue information started dealing with all 112 calls - both 'classical' and eCall. On-going installation of a central enforcement system – including speed cameras, weigh in motion, red light violation, etc.

Portugal established the legally binding requirements to engage the national stakeholders and set up a platform to implement eCall.

Romania participated in HeERO (Harmonised eCall European Pilot) and is installing video surveillance systems, focused on urban areas.

Slovakia focuses on precise positioning of transport incidents and redesigning accident black spots.

Slovenia implemented eCall on motorways, integrated into existing traffic information system and studies future possible functionalities (e.g. video calls planned, prototypes for automatic language recognition). Some (free of charge) public parking places are secured with video surveillance.

Spain was involved in the project HeERO2 testing the harmonised European eCall system.

The DGT is working on the establishment of a common set of minimum requirements for the provision of Intelligent Safe and Secure Truck Parking Information via VMS and web/apps.

In **Sweden,** since 2012, alco-locks are used as part of penalty and treatment for people convicted for drunk driving. It is also voluntarily implemented in some commercial fleets.

Sweden led an Impact Assessment proving the positive socio-economic effects of eCall.

Sweden has set up a project for introducing the specification on secure truck parking, but does not foresee to provide truck parking on commercial basis nor reservation services.

UK invested in enforcement (speed cameras, 3D scanners, Weigh in Motion (WIM) and Automatic Number Plate Recognition) and in Scotland PSAP1 is almost 112 eCall ready.

In 2013 TfL published Safe Streets for London: speed cameras along the A13, pedestrian countdown timers, digital speed limit map, ITS trial on London buses planned in 2015, trials on collision detection, blind spot technology to be fitted on HGVs.

Highlights on the deployment of 112 eCall in the PSAPs (Public Safety Answering Points)[9]

Based on the reports of the ITS Directive, which almost all mentioned the need to implement eCall, and on the reports due under article 3 of Decision No 585/2014/EU (unfortunately only 11 reports received by the end of February 2016), the following picture can be drawn, as shown in figure 4:

- Five Member States are technically ready at PSAP level: Czech Republic, Croatia, Lithuania, Romania, Slovenia. Some activities may still be necessary regarding in particular conformance testing.
- Twelve Member States participate also currently in the two 2014 CEF projects I-HeERO[10] and eCall.at[11].
- Several other Member States (Estonia, Denmark, France, Hungary, Netherlands, Latvia) indicated on-going work and timeline in accordance with the deadline.
- Other Member States (Hungary, Poland, Spain, Sweden), although showing sometimes a very high level of activity (in particular through participation in HeERO I or II pilots), did not give concrete information about the timeline for real implementation.
- Remaining Member States (Belgium, Malta, United Kingdom except for Scotland) did not report any information about concrete plans for implementation of eCall in their PSAPs.
- Thanks to the HeERO I and II pilots, and now with the I-HeERO and eCall.at CEF projects, 19 Member States benefited from EU funding for the implementation of the 112 eCall in their PSAPs.

[9] http://ec.europa.eu/transport/themes/its/road/action_plan/ecall_en.htm
[10] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/projects-by-country/multi-country/2014-eu-ta-0582-s
[11] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/projects-by-country/austria/2014-at-ta-0259-m

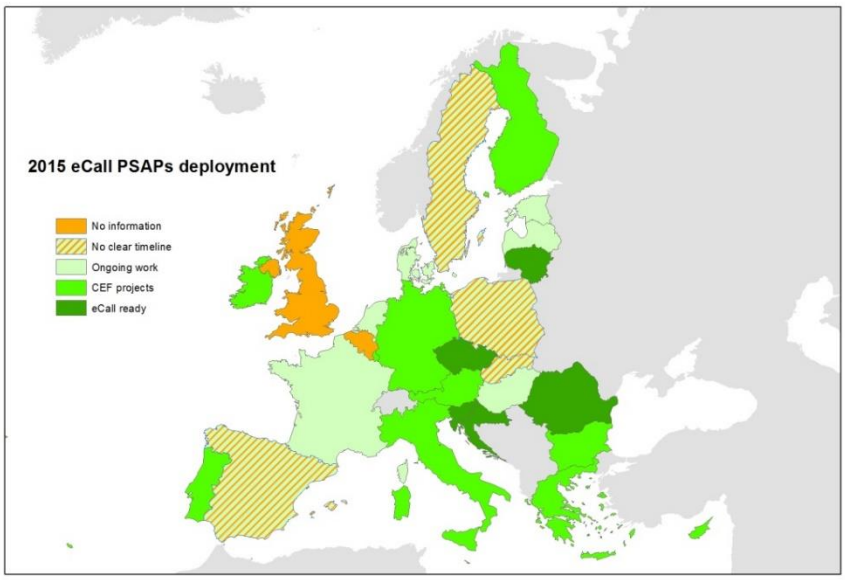


Figure 4: Deployment of 112 eCall in PSAPs in 2015

Things are of course moving fast in this domain, as the deadline set in the eCall Decision comes nearer, and as this figure is based on data sometimes already ancient, the situation may have improved at the date of publication of this analysis. The information received until now shows a rather general commitment of the Member States towards the deployment of eCall in the PSAPs, but of course does not give yet a full picture of their future compliance with the deadline of 1st October 2017.

Highlights on the implementation of specifications (e)[12]: provision of information services for safe and secure parking places for trucks and commercial vehicles

Member States' reports on these activities show steadily development across Europe.

The German MDM Mobility data marketplace shall become the point of access of truck parking information. Until end of 2015 up to 200km of segments were reported to be equipment with Truck parking guidance systems.

Spain is working on the establishment of a common set of minimum requirements for the provision of Intelligent Safe and Secure Truck Parking Information via VMS and web based applications.

Sweden has set up a study for introducing the specification on secure truck parking. Sweden wants to make the best use of European initiatives on ITP - Intelligent Tuck Parking, but does not foresee to provide truck parking on a commercial basis nor reservation services.

[12] Commission Delegated Regulation (EU) No 885/2013 of 15 May 2013 supplementing ITS Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles - OJ L 247, 18.9.2013, p. 1

Note: the European Commission is managing a European Access Point for Truck Parking Data to enable continuity of services. The European Access Point for Truck Parking aims to provide access to static safe & secure truck parking data in DATEX II format. Already in March 2016, three Member States (Austria, Germany and Netherlands) have provided and published DATEX II truck parking data on the European Access Point.

3.4. Priority Area IV: Linking the vehicle with the transport infrastructure

As stipulated in Annex I of the ITS Directive, priority area IV is focused upon ITS applications on open in-vehicle platforms and the development and implementation of cooperative systems including vehicle to vehicle, vehicle to infrastructure and infrastructure to infrastructure communication.

Overall less activity is reported in **priority area IV** than in other areas, though considerably more than in 2011. Some Member States are far more active, notably those that are involved in large C-ITS pilot deployment activities, where others are apparently waiting till the effectiveness and efficiency have been proved on such much larger scales. Others report increased interoperability or digitisation of tolling systems and some mention the EETS directive. Finally some Member States report testing activities in automation, which also has an impact on infrastructure. Examples of interesting initiatives are listed hereafter.

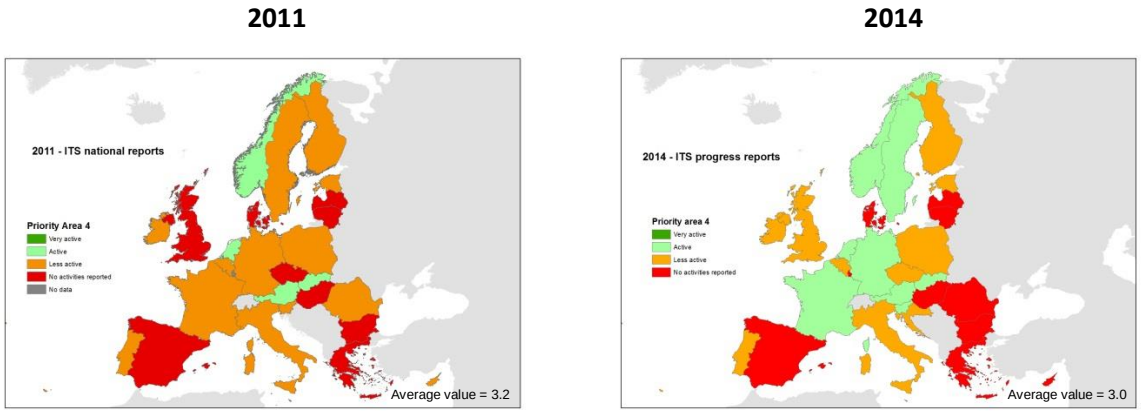


Figure 5 : Priority Area IV – Evolution 2011-2014

Austria is very active in the field of cooperative services and systems with demonstration activities in Greater Vienna and participation in the C-ITS Corridor Rotterdam-Frankfurt-Vienna.

Croatia launched the national programme for monitoring of cooperative systems in road traffic in the European Union.

Czech Republic has completed a project regarding increasing road safety by the use of cooperative systems, looking into questions of design and implementation of V2V and V2I.

Estonia intends to implement dynamic traffic regulation with adjustable speed limits.

France supports standards on (real-time) connectivity of vehicles (New ISO Work Item Proposal N3401 "Extended vehicle Methodology") and is also very active in testing of C-ITS systems, SCORE@F and COMPASS4D were finalised, and SCOOP@F, a large pilot deployment project was launched, including large scale testing in 2016 of Co Sy in different configurations (motorway, road, urban), in view of possible national deployment as from 2017..

Germany is a partner in the C-ITS-Corridor Rotterdam – Frankfurt/Main – Vienna, where the first C-ITS applications for road works construction trailers will be implemented.

In **Greece,** the interoperable Tolling System (GRITS) allows the use of the same transponder at all electronic toll lanes of the participating motorways.

In **Hungary,** the electronic distance-based toll system (DTS) has been introduced on 6,500 km of the Hungarian public road network (motorways, highways, main roads).

Ireland has tolling interoperability in place for some time, also taking into account the requirements of EETS, and is evaluating Ghost Driver Signs pilots.

Latvia reported some implementation actions, such as roadside sensing and traffic control.

Netherlands is very active in the area of cooperative systems and field operational tests (e.g. COMPASS4D, FREILOT, Brabant In-Car II, SENSOR CITY Mobility, APT, GREEN WAVE TEAM) are transitioning to actual implementation in the C-ITS corridor Rotterdam – Frankfurt/Main – Vienna.

In Norway, the integration of different ITS in an open in-vehicle platform is being tested and the AutoPASS tolling system is interoperable also cross-border. A test site for C-ITS systems has been set up in one city and cooperative weight in motion for trucks has been implemented.

Poland reports an extension of electronic tolling. Some regional projects related to integrated public transport management, red light violations and connectivity.

In **Portugal** some concession holders have developed solutions and implemented pilot projects but no links with the EU activities at this stage.

Slovakia operates a satellite tolling system, whose data on traffic flows could be used for real-time traffic information, as well as planning transport upgrades and evaluating measures taken.

Slovenia has some pilots on cooperative traffic management at local level (e.g. using DSRC for signal bus priority & better info at bus stops in Ljubljana).

In **Sweden,** the Drive Me project will demonstrate the benefits of autonomous vehicles around Gothenburg, and advance the research on how cars can handle different traffic scenarios. A pre-study concluded that partly autonomous driving is within the limits of current legislation.

In the **UK,** several initiatives on Cooperative Systems and autonomous vehicles: on-demand transport services, feasibility study on heavy vehicle platooning, Oxford Driverless Car Trials,

smart pedestrian crossing and GNSS analysis of cyclists movements through London, £10million Prize Fund announcement for a city for Driverless Cars.

4. CONCLUSION

The general trend is a positive evolution of the deployment of ITS at national level, for all four priority areas. Nevertheless, it is not clear how national activities can be linked to a general improvement in terms of overall interoperability of services across the EU, this could deserve a more specific reporting exercise which may be beyond the reach of purely national reporting.

In addition, it is difficult to provide a clear picture at a specific date of this deployment, as the reports were transmitted for a period extending over a whole year, and also because the reports on the specifications were also due to different dates. This particular issue would advocate for a future simplification/aggregation of reporting duties in a future revision of the ITS legal framework.

In accordance with the recommendations set in the analysis of the 2011 reports, the progress reports provided much more information compared to the 2011 version, which allowed sometimes a better ranking for some Member States which were perhaps under-rated in 2011, but sometimes entailed artificial progression due to underestimated initial status.

Some limitations of the initial reports, e.g. the overlaps concerning the activities related to priority area I and II, still remain in the progress reports and therefore would perhaps benefit from more guidance before the drafting of the next reports.

Regarding specifically eCall, most of the Member States show a strong willingness to deliver the upgrade of their PSAPs infrastructure in time. Nevertheless, the information provided is often not sufficient to be able to judge if this will be really the case, and appropriate follow-up will certainly be needed.

Priority area IV, which was clearly lagging behind in 2011, witnesses the emergence of many pilot projects for cooperative systems, which may confirm the appropriateness of the definition of a common legal and technical framework in order to ensure interoperability and continuity at EU level.

5. SUGGESTIONS FOR NEXT PROGRESS REPORTS[13]

In the light of the analysis of the 2014 national progress reports, the following remarks can be made in view of the follow-up reports due in 2017:

- The analysis by the Commission would be facilitated if Member States could more systematically follow the structure of the Guidelines on reporting and

[13] These suggestions have been shared in 2016 with the representatives of the Member States to the ITS Committee, and triggered follow-up work to prepare the 2017 reports.

clearly distinguish the four different priority areas of Directive 2010/40/EU. Within these priority areas, a distinction between the six priority actions of the ITS Directive is also recommended. As this aspect was already mentioned in the analysis of the 2011 reports, a solution to overcome this issue would perhaps be to agree with Member States on a common report structure for 2017.

- Many Member States followed the indications given in the context of the analysis of previous reports and hence shared more details about their national initiatives. In some cases, however, this has led to overly rich information being provided for a given series of numerous projects, without providing an overall picture at national level, in particular for the amount of equipment or investment figures. A common report structure, associated with common Key Performance Indicators (KPIs), may help in solving this issue by setting a common reporting framework, to be used on a voluntary basis.

B - ANALYSIS OF 2017 REPORTS ON NATIONAL ACTIVITIES AND PROJECTS

1. INTRODUCTION

The present document summarises the analysis of the national progress reports of 2017[14], provided by the Member States as per Article 17(3) of Directive 2010/40/EU[15].

The guidelines for reporting, adopted as Commission Implementing Decision of 13.7.2011[16] indicate that "The reports to be provided under Article 17(3) of Directive 2010/40/EU, hereinafter referred as 'the progress reports', should follow the same structure as the initial report and should highlight the progress made since the previous report."

This analysis takes also into account reports to be provided in 2016 and 2017 regarding the implementation of the already adopted specifications for the priority actions of the ITS Directive. In particular, Member States had to report on Delegated Regulation (EU) 2015/962 by 13 July 2017 and on Delegated Regulations (EU) 885/2013 and 886/2013 by 8 October 2017. These reports were sometimes integrated in the general report on the implementation of the ITS Directive or provided separately. Regarding eCall, reports due under Decision 585/2014/EU were taken into account, as well as information provided in the 2017 national progress reports.

This summary constitutes an overview of these national reports, based solely on their content and on the Commission's understanding of these reports. Nevertheless, for some Member States the participation in EU-funded projects was taken into account even if they did not specifically mention it in their reports. Although this summary addresses the implementation of the different specifications adopted under the ITS Directive, this does not preclude further specific analysis of the implementation of the related Regulations and of the eCall Decision 585/2014/EU.

2. GENERAL OBSERVATIONS

Twenty-nine national progress reports have been received (28 Member States and Norway). Approximately one third of them did meet the deadline of the 27 August 2017. Reception of the remaining reports spanned until November 2018.

In line with the recommendations of the analysis of the 2014 reports, for the first time, a common reporting template[17] was proposed by the Commission services, integrating the reporting obligations under the ITS Directive, but also the reporting obligations deriving from the different specifications for the priority actions adopted as Delegated acts supplementing the ITS Directive. In the same reporting template, Member States were invited for the first

[14] Published on http://ec.europa.eu/transport/themes/its/road/action_plan/its_national_reports_en.htm
[15] OJ L 207, 6.8.2010, p. 1.
[16] OJ L 193, 23.7.2011, p.48.
[17] Template available on https://ec.europa.eu/transport/themes/its/road/action_plan/its_national_reports_en

time to report on common deployment, benefits and financial ITS Key Performance Indicators (hereafter also referred to as "KPIs")[18].

Thirteen national reports used the common reporting template, sometimes completed by other reports on the implementation of the specifications for the priority actions. Regarding the KPIs, the input of the Member States was rather limited (11 Member States and Norway reported at least partly on deployment KPIs, 4 at least partly on benefit KPIs and 8 at least partly on financial KPIs). As this was the first time that Member States were invited, on a voluntary basis, to provide KPIs, no comparison could be made with previous reports and this input can be considered as a starting point for the analysis of future reporting exercises. To be noted the strong correlation (75%) between the use of the common reporting template and the provision of KPIs.

3. DETAILED ANALYSIS

In general the national reports provided a good overview of the Member States' (best) practices. In comparison to the situation reported in 2014, the analysis shows a general progress in all four priority areas.

The analysis of the national reports was structured along the four priority areas of the ITS Directive. The level or intensity of activity in each of the four priority areas was assessed on the basis of the information contained in the reports with a detailed comparison of the progress reported in 2014. This assessment resulted in the development of two colour coded tables reflecting the Member States' level of activity in each priority area in 2017 and assessing the progress since 2014, based on the following codes and definitions:

Colour code for level of activity (2017):

1	1 = very active = services deployed countrywide
2	2 = active = many projects and/or strategy in place
3	3 = less active = some projects
4	4 = no activities reported

Colour code for progress (2017 vs 2014)

1	Value 1 = Excellent progress
2	Value 2 = Good progress
3	Value 3 = Some progress
4	Value 4 = No progress

These tables have the objective to highlight general trends in terms of level of activity and evolution thereof from 2014 to 2017 for each priority area of the ITS Directive rather than trying to reflect very accurately the detailed situation in each individual Member State. To be noted that in very few cases, demotion in a priority area was justified by the discontinuation of activities (or at least absence of reporting) after 2014.

[18] Description of KPIs on https://ec.europa.eu/transport/themes/its/road/action_plan/its_national_reports_en

	Level of activity 2017				Progress 2017/2014			
	Priority area I	Priority area II	Priority area III	Priority area IV	Priority area I	Priority area II	Priority area III	Priority area IV
Austria	1	1	2	2	2	2	2	2
Belgium	1	2	2	2	1	2	3	2
Bulgaria	2	2	3	3	2	3	3	3
Croatia	2	3	2	4	3	3	2	4
Cyprus	2	3	2	4	2	2	2	4
Czech Republic	1	2	1	2	1	2	2	2
Denmark	1	2	2	2	2	2	2	2
Estonia	2	2	2	3	2	2	2	3
Finland	1	1	2	2	2	2	2	2
France	1	2	2	2	2	3	2	1
Germany	1	1	2	2	2	2	2	2
Greece	2	2	2	3	2	2	2	3
Hungary	2	2	2	2	2	2	2	2
Ireland	2	2	2	3	2	3	2	3
Italy	1	2	3	2	3	3	3	2
Latvia	3	4	3	4	3	4	2	4
Lithuania	1	1	2	3	2	2	2	3
Luxembourg	2	3	2	3	2	3	2	3
Malta	2	3	2	4	3	4	2	4
Netherlands	1	1	1	2	1	1	2	2
Norway	1	1	2	2	1	2	3	2
Poland	2	1	2	3	2	1	2	3
Portugal	2	3	2	2	3	3	2	2
Romania	2	2	2	4	3	3	2	4
Slovakia	2	2	2	3	2	4	2	3
Slovenia	2	2	2	2	2	2	2	2
Spain	1	2	2	2	1	1	2	2
Sweden	1	1	2	2	2	2	2	2
United Kingdom	1	1	2	2	2	2	2	2

The following table shows as well the level of deployment of National Access Points (NAPs) at the time of writing of this report. The red colour highlights a lack of information and/or a lack of deployment of the NAPs in several Member States. An up-to-date and detailed list of the NAPs is also available on the Commission's website[19].

Colour code for National Access Points

[19] https://ec.europa.eu/transport/themes/its/road/action_plan/nap_en

Country name	MMTIS National Access Point	RTTI National Access Point	SRTI National Access Point	SSTP National Access Point	SSTP EU Access Point
	Delegated Regulation 1926/2017	Delegated Regulation 962/2015	Delegated Regulation 886/2013	Delegated Regulation 885/2013	Delegated Regulation 885/2013
	(action 'a')	(action 'b')	(action 'c')	(action 'e')	(static data - action 'e')
Austria					
Belgium					
Bulgaria					
Croatia					
Cyprus					
Czech Republic					
Denmark					
Estonia					
Finland					
France					
Germany					
Greece					
Hungary					
Ireland					
Italy					
Latvia					
Lithuania					
Luxembourg					
Malta					
Netherlands					
Norway					
Poland					
Portugal					
Romania					
Slovakia					
Slovenia					
Spain					
Sweden					
United Kingdom					

3.1. Priority area I: Optimal use of road, traffic and travel data

As stipulated in Annex I of the ITS Directive, priority area I is specifically focused upon the availability, accessibility and exchange of public and private road, travel and traffic data used for multimodal travel information, real-time traffic information services and digital maps.

Priority area I was generally the best documented, indicating that most Member States are actively pursuing work in this area. Initiatives that were commonly reported related to: real time traffic information, development of apps, dynamic public transport information, multimodal journey planners and electronic ticketing systems, as well as work to improve data collection, management and publication processes. These types of projects aim to enable

improved travel planning, better navigation services and may allow for more informed decisions while planning (and during) travel.

Some countries reported on their infrastructure projects, which are helping to provide better and more accurate data collection and sharing. For example, these include large-scale EU funded projects for the installation of cameras for traffic monitoring, weather monitoring equipment, automatic traffic counters and electronic information boards.

Activities related to setting up the National Access Points (NAPs) for the various types of data covered by priority actions a, b and c are also advancing, with many projects noting the use of the DATEX II standard for data exchange. An overview of reporting on the Delegated Regulations is provided below.

Progress since 2014

Since 2014, many countries have made significant progress within this priority area and have made significant steps towards implementing the NAPs required for priority actions a, b and c. Several Member States reported on their participation in the EU funded CROCODILE 2 project[20] (Austria, Bulgaria, Croatia, Cyprus, Czech Republic, Germany, Greece, Hungary, Italy, Poland, Romania, Slovakia and Slovenia), which has helped to ensure the necessary infrastructure is in place to enable data exchange based on DATEX II and helped also in some cases to set up the national access point. This has contributed to the work for priority actions b, c (and also e). CROCODILE 2 also resulted in 2500 km of corridor motorway being equipped with technology allowing data collection, including CCTV, road weather stations and sensors.

Besides the work carried out to comply with the delegated regulations, many other projects have taken place/are taking place throughout the EU to ensure that road, traffic and travel data is better utilised. A few examples are mentioned below, together with their timescales and funding where available. These have been selected due to their innovative features, large scale or because they represent significant progress since 2014. ITS projects that are very common across Member States are also mentioned where relevant.

- **Improved data collection infrastructure and variable message signs** have been installed in Member States, sometimes for the first time:
    - Bulgaria established its first automated traffic data collection system in 2014, comprising 120 automated counter stations, helping to obtain real-time traffic information. Two other projects have since allowed a further 200 automatic count points to be installed along the TEN-T network, primary and secondary roads.
    - A joint Latvian/Estonian, Smart E67 EU-funded project, involved the installation of roadside ITS equipment and upgrading of the traffic information

[20] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-eu-tm-0563-w

centre run by VAS Latvijas Valsts ceļi (Latvian State Roads). This included the first-time deployment of variable message signs and multifunctional live video surveillance.

- Poland has installed various weather warning systems and variable message signs.
- Norway implemented real time travel time registration in Norway's four largest cities. A web camera service offers road users a picture of the traffic situation and driving conditions from more than 500 cameras and will soon offer a video streaming service with image updates every second. Inclusion of friction data from vehicles in the road weather information system (Vegvaer) has been tested within the Nordic Way project.
- Belgium has several projects underway in Brussels to improve data collection and provide real-time parking information. The Parking Guidance project (2008-2017, €4.5m) involves placing dynamic signs to list how many spaces are available, while the Metropolitan Area Network Brussels (MANBRU, 2017-2018, €3m) is developing fibre optics to help show available parking spaces to road users.

- Several reports mentioned the work to improve the **exchange of ITS-related spatial road data between road operators and the providers of digital maps which** has been carried out during the TN-ITS project[21]. This activity (involving Belgium, Finland, Ireland, Sweden, United Kingdom and Norway, and private digital maps providers) within the EU-funded EU ITS Platform (EU EIP)[22] project has helped to ensure that data updates (e.g. speed limits and other traffic regulations) from trusted public data providers can be directly incorporated into ITS digital maps used for navigation and other ITS services. This project has been followed (since January 2018) by a CEF Programme Support Action (TN-ITS GO) involving the before-listed beneficiaries and nine additional Member States.
- New techniques, such as **floating car data**, have been explored for collecting real-time traffic data and using this to more accurately predict journey times or for statistical use (e.g. parameter setting for extra ordinary queuing). Denmark and the Netherlands have implemented projects which are showing promising results.
- Many countries reported developing **nationwide journey planners**, which often offer multimodal capabilities. For instance:
  - Estonia has set up http://www.peatus.ee, a multimodal journey planner for all of Estonia, with plans to implement cross-border functionalities.

[21] Relevant standardisation activities (based on the TN-ITS specification) have also taken place within CEN TC278 WG7 (the ITS spatial data working group)

[22] https://eip.its-platform.eu/, involving Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Spain, Sweden, United Kingdom

- In Finland Helsinki Region Transport HSL and the Finnish Transport Agency FTA have developed an open journey planner platform https://digitransit.fi/en/ which is the basis for several journey planners both in Finland and other countries.
- In Norway, a new national multimodal travel planner was to be launched in November 2017.
- Lithuania developed a new route planning system based on the Public transport Multimodal Journey Planning Database System (IS Vintra), available on: http://www.visimarsrutai.lt/.

Solutions for **connected traffic signals**, which can exchange data with vehicles were mentioned in the Dutch and Swedish reports. Notably, in the Netherlands around 1,250 traffic control systems (one quarter of those in the Netherlands) are expected to have been replaced with intelligent traffic control systems (that can communicate with approaching vehicles and cyclists) by the end of 2017. This is being achieved through the Partnership Talking Traffic, a €90m project running until 2020 to develop innovative traffic applications, including the use of low latency C-ITS messages and services.

Implementation of specifications (a)[23]: provision of EU-wide multimodal travel information services

As the Delegated Regulation for priority action a ((EU) 2017/1926) has only entered into force in November 2017 and Member States were required to report on activities related to this specification only by 1 December 2019, little information is included in the national reports.

However, several Member States already started to establish National Access Points, as listed in the list of NAPs maintained by the Commission. This work is being supported by individual CEF Programme Support Actions for 17 Member States.

Implementation of specifications (b)[24]: the provision of EU-wide real-time traffic information services

One of the main purposes of specifications (b) is to foster the market to further develop services for the provision of real-time traffic information by re-using public sector data made available throughout the National Access Points. During the observed period, implementation of specifications has followed different procedures, priorities and levels of commitment, across the Member States. The stocktaking for these different approaches also shows that the implementation is progressing, although slower than expected. Several dimensions have been reported to explain the current implementation landscape:

[23] Commission Delegated Regulation (EU) 2017/1926 of 31 May 2017 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide multimodal travel information services - OJ L 272, 21.10.2017, p. 1

[24] Commission Delegated Regulation (EU) 2015/962 of 18 December 2014 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services - OJ L 157, 23.6.2015, p. 21

- the spatial dimension (i.e. relevant road network, interfaces with other urban and interurban areas/networks, coverage of ITS services),
- the operating environment dimension (i.e. network characteristics and topology, road status, traffic characteristics, ITS infrastructure/equipment),
- the organisational dimension (i.e. allocation of resources and responsibilities, ITS processes/workflows),
- the financial dimension (i.e. investment, maintenance, operation).

17 Member States + Norway have reported to have set up their NAP, while 5 other are taking action to do so shortly. Several technical aspects to make the data and metadata available and publishable needed to be addressed, such as the profiling for static and dynamic data or procedures to give access to data updates. Many Member States are taking part in different Programme Support Actions (e.g. DATEX II and TN-ITS) to overcome some of these barriers. Member States also often refer to the EU EIP guidance in terms of quality assessment. Some Member States have reported the need to go through consultation process, addressing the different national stakeholders (e.g. service providers, road operators and motorway companies) before being able to agree on the terms for defining the quality criteria and the methods of evaluation. These have been long and complex negotiation procedures and may have benefited from a harmonised approach.

In order to undertake the assessment of compliance of the relevant stakeholders with the requirements of the Regulation, several Member States have reported to be using the harmonised self-declaration template, developed by EU EIP and TISA. Random checks of the correctness of these declarations are still very limited and at a very early stage of implementation.

Implementation of specifications (c)[25]: data and procedures for the provision, where possible, of road safety related minimum universal traffic information free of charge to users

As for specifications (b), different activities have helped Member States with the implementation of specifications (c), in particular at technical level; harmonised self-declaration template; DATEX II profiling; the metadata catalogue produced by Austria, Germany and the Netherlands and a proposal for a common quality framework produced within the EU EIP project. Most of these tools have been referenced in the Member States' reports, clearly showing EU added value as an outcome of voluntary Member States cooperation towards the implementation of the specifications.

Almost all National Access Points set up for specifications (c) are also used for specifications (b). The collection of road safety-related traffic information by public sources is progressing in good pace across the EU. Most Member States have put in place the DATEX nodes and are

[25] Commission Delegated Regulation (EU) No 886/2013 of 15 May 2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users - OJ L 247, 18.9.2013, p. 6

making accessible the data they collect, formatted, at the NAPs. Most of them reported to cover the eight data categories presented in the specifications along the TEN-T Corridors.

Only one third of the Member States and Norway reported to have in place a national body[26]. The Member States' reports show that progress with the implementation is unbalanced, with most coming from the public sector side. Very few declarations[27] have been received from private entities, some of which operate globally and provide information services that fall within the remit of the specifications (c).

3.2. Priority area II: Continuity of traffic and freight management ITS services

As stipulated in Annex I of the ITS Directive, priority area II is focused on the provisions to support traffic and freight management services including traffic information/management control centres, ITS framework architecture, tracking and tracing of freight, integrated multimodal ticketing.

Priority area II has attracted a significant amount of attention from Member States and a diverse range of activities have been carried out within this area. Several countries have worked towards improvement of their traffic management systems, either through modernisation activities, a new system architecture, or via the use of improved data sources. These have aimed to improve reliability and efficiency. On the infrastructure side, the installation of traffic light systems to prioritise public transport and emergency vehicles in cities is also becoming more widespread.

Several projects within this priority area showed a significant intermodal element, particularly for more effectively linking up road and rail transport. These types of activities have mainly aimed to provide a more seamless travel experience. This has been targeted by the development of multimodal smart/e-ticketing for public transport, as well as other measures. A few countries also reported activities related to intermodal terminals for freight transport.

There has been considerable activity in freight management services, which has been mainly driven by the increasing digitalisation of freight. For example, the national reports showed evidence of the development of innovative tools and online systems for road freight information and management. These are primarily aimed at improving the efficiency and transparency of freight solutions. Again, there was evidence of some projects with an intermodal element, aimed at helping the continuity of services across the EU.

Progress since 2014

[26] According to Article 9 of Delegated Regulation (EU) No 886/2013, Member States shall designate an impartial and independent national body competent to assess whether the requirements set out in Articles 3 to 8 are fulfilled by public and private road operators and service providers and broadcasters dedicated to traffic information

[27] According to Article 9, public and private road operators, service providers and broadcasters dedicated to traffic information shall provide the designated national bodies with their identification details and a description of the information service they provide, and submit a declaration of compliance with the requirements set out in Articles 3 to 8.

Many countries provided explanations of projects that have started since 2014 in their national reports, which helped to demonstrate the progress that has been made across the EU. ITS themes common across countries are listed below, together with examples of national activities. These projects were selected due to their innovative nature, level of investment/scale, or because they represent significant progress for the Member State since 2014.

- Several reports mentioned the continued work of the **EU EIP project**, which encourages better knowledge management and contributes to the effective use of ITS standards and specifications across the EU.
- Some Member States reported also on the recent **FRAME NEXT** project (funded as a Programme Support Action under the CEF programme) started in June 2017 with the objective to further develop a European ITS architecture and involving Austria, Germany, France, Hungary, Czech Republic, The Netherlands, Norway, Sweden, Poland, United Kingdom.
- As mentioned in many reports, and building on work from previous years, the **cross-border deployment of Traffic Management Services** has continued across TEN-T Corridors. These large-scale projects have a range of aims including facilitating cross border connectivity, reducing congestion, improving safety, ensuring interoperability, and enhancing harmonised and continuous services. For example:
    - Arc Atlantique corridor Phase 2 focussed mainly on deploying traffic management and traffic information ITS services, to enhance harmonised services on 11,000 km of network, and improve operational and cost efficiency on 10,000 km of network (2014-2017; participating countries: Belgium, Spain, France, Ireland, Netherlands, United Kingdom; €115m funding, of which €23m EU funding)[28].
    - MedTIS II implements ITS on a continuous 8,600 km stretch of motorway on the Mediterranean TEN-T corridor. Deployment is focussed on road data collection and monitoring, upgrade of traffic control centres, enhancement of alert services and related traveller information (2014-2018; participating countries: France, Italy, Portugal, Spain; €53m funding of which €10.7m EU funding)[29].
- Several countries reported **upgrading their national traffic management systems**, including Bulgaria (various modernisation projects), Finland (as part of the LOU project - €30m for the road traffic management system), Poland (National Traffic Management System on the TEN-T network – stage I project: Implementation: 2016-2020, then 2019-2023 – system integration. Total funding €145m) and Sweden (Traffic Management System, NTS, for the period 2018-19, €13.5m).

A few **innovative logistics projects** were also mentioned. These projects aimed to support digitisation of freight management and improve efficiency.

[28] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-eu-tm-0597-w
[29] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-eu-tm-0588-w

a. Netherlands has implemented several projects for better data sharing. For instance, the Neutral Logistic Information Platform (NLIP) is a state-of-the-art information channel for maximising data availability within the logistics flow, by linking several existing information platforms, which should eventually be integrated. By 2020, 90% of the Dutch supply chain should be connected (€6m per year). The electronic consignment note is another area of focus – digitisation of this essential documents can generate cost savings and lower the risk of fraud.

b. Greece has been working on the New Cooperative Business Models and Guidance for Sustainable City Logistics (NOVELOG) project and the Green Intermodal Freight Transport (GIFT) projects, which aim to optimise freight transport and reduce the environmental footprint.

c. InterCor involves France, Belgium, the Netherlands and the United Kingdom and extends functionally services built earlier within SCOOP@F or the corridor Rotterdam-Frankfurt-Vienna to additional C-ITS services in the logistics field for heavy goods vehicles.

d. Finland and Estonia have worked together on the FinEstSmartMobility project, which implemented a smart guidance for heavy goods vehicles at ports for the Helsinki/Tallinn ferry connection. The project aims to integrate multimodal transport between cities and across borders and reduce the transport time for passengers and cargo.

3.3. Priority area III: ITS road safety and security applications

As stipulated in Annex I of the ITS Directive, priority area III is focused on activities related to eCall and the data exchange between vehicles and emergency call response centres, safety of Human-Machine-Interfaces, use of nomadic devices, security of in-vehicle communications, measures to improve the safety and comfort of vulnerable road users for all relevant ITS applications, advanced driver support information systems and the availability and exchange of truck parking information and reservation data.

The analysis of the 2017 national reports indicated that fewer activities have been carried out within this priority area compared to priority areas I and II. This is a similar picture to what was observed in previous years. However, significant overlaps were noticed between priority areas III and IV, as many of the cooperative ITS services being implemented have been safety focussed (but are generally reported in the priority area IV section).

Progress since 2014

Concerning the types of projects reported, eCall related work was by far the most widely reported. This was likely influenced by Decision 585/2014/EU, which mandated the deployment of eCall PSAP infrastructure in Member States (see below). The next most frequently reported projects related to safe and secure truck parking, which indicates that setting priority actions in the Directive has helped to direct Member States' activities within this area.

Since 2014, many countries have focussed their activities on ensuring that the necessary Public Safety Answering Point (PSAP) infrastructure is in place to properly deliver eCall. Many countries reported on the EU-funded Infrastructure Harmonised eCall European Pilot (I_HeERO[30]) project, which enabled PSAPs in 11 Member States (Belgium, Cyprus, Czech Republic, Finland, Germany, Greece, Ireland, Italy, Portugal, Romania and Slovenia) to install the necessary hardware, software and organisation to receive and handle eCalls. The project also helped to perform PSAP Conformity Assessments, which is a legal obligation for all PSAP handling eCalls based on 112. I_HeERO built on the HeERO and HeERO 2 projects, in which many other Member States also participated. Austria reported also on the EU-funded eCall.at[31], which focussed on the implementation and certification of 9 PSAPs in Austria.

As well as eCall related projects, other large-scale EU-funded ITS projects have been reported relating at least partly to priority area III. These include:

- NEXT – ITS 2 aimed to improve the efficiency, safety and security of the Northern part of the Scandinavian-Mediterranean CEF corridor. Traffic management centres were upgraded and ITS services such as real-time traffic and weather monitoring and variable speed limits were installed (2015-2017; €35.9m, of which €7.2m EU-funded; involved Denmark, Finland, Germany and Sweden)[32].
- Ursa Major 2 is aiming to improve the safety and efficiency of freight traffic mainly along the Rhine-Alpine CEF core corridor. The project is working on enhancing truck parking services and supporting navigation services, in line with priority action e (2014-2018, €92.3m of which €18.5m EU-funded; involved Austria, Germany, Italy, Netherlands)[33].
- CROCODILE 2 (also reported under priority area I) is aiming to ensure more coordinated traffic management services. It is directly contributing towards the development of national access points, particularly for priority actions b, c and e, and installed additional truck parking places equipped with technology to be integrated into the dynamic ITP information system.

Besides these EU-level projects, a number of national level projects were also included in the national reports. As for other priority areas, these examples have been selected due to their innovative features or because they represent significant progress since 2014:

- **Speed limit enforcement** projects were mentioned in several reports (e.g. Belgium, Estonia, Latvia, Lithuania, Malta, Poland and Sweden). These involved the installation of traffic cameras/photo radars, average speed check cameras, devices to detect red light running and the necessary software for automatic data processing.

[30] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-eu-ta-0582-s
[31] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-at-ta-0259-m
[32] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-eu-tm-0310-w
[33] https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport/2014-eu-tm-0365-w

- Lithuania developed a **Multifunctional traffic enforcement system (MTES)** deployed on three high volume road sections to check e.g. if the road user charge has been paid, if a vehicle is insured and has valid technical supervision certificate.
- **Large animal detection** projects were carried out in both Estonia and Finland. For example, in Finland, a pilot was carried out as part of the Aurora test ecosystem, to reduce the number of reindeer accidents that occur (currently 4,000 per year on Finland's roads and railways). After a successful pilot, a real service that provides real-time reindeer warnings to drivers through in-car navigation systems and mobile apps using Global Navigation Satellite System (GNSS) and mobile technology, was opened to public in 2017 and is still running.
- **Dangerous goods monitoring** has been improved in Italy via use of a National Logistics Platform (PLN) to collect and exchange data.

Other types of projects carried out include for instance implementing digital audio broadcasting (DAB) to allow serious incident warnings to be broadcast in tunnels (Belgium) or safer crossings at level nodes of the railway network (Greece). As already mentioned, countries with quite advanced C-ITS activities also mentioned their safety-focussed C-ITS work in this section of the report (e.g. Denmark, Netherlands, Sweden).

Another finding was that very few Member States reported carrying out projects that were focussed on security applications. However, two countries (Netherlands and Sweden) included security aspects as part of their national ITS strategies.

Deployment of 112 eCall in the PSAPs[34]

The delegated regulation (No 305/2013) for this priority action provides specifications for Member States to upgrade Public Safety Answering Point (PSAP) infrastructure to enable the harmonised provision of an interoperable EU-wide eCall service. As stated in Decision 585/2014/EU, Member States were required to have their PSAP infrastructure ready for receiving and handling eCalls by 1st October 2017. By 1 October 2017, 23 countries reported that their PSAP infrastructure was ready for eCall. Of these, the Netherlands stated that a provisional system is in place and Spain indicated eCall may not be fully ready in some regions. Infrastructure in four countries (Belgium, Bulgaria, Germany and Slovakia) was still under development; of these, Germany and Slovakia expected to be ready by March 2018, while Belgium and Bulgaria did not provide a date. Hungary did not provide information. In November 2017, Norway was still preparing a technical solution to be implemented in one or more of the 12 emergency centres by April 2018.

The situation has improved in the course of 2018 and at the date of writing of this report (30 November 2018), only one issue seemed to remain, based on the declarations of Member States, i.e. the lack of deployment for Ceuta and Melilla in Spain.

[34] http://ec.europa.eu/transport/themes/its/road/action_plan/ecall_en.htm

Implementation of specifications (e)[35]: provision of information services for safe and secure parking places for trucks and commercial vehicles

The delegated regulation for this action was adopted in 2013 and provides specifications to ensure the compatibility, interoperability and continuity of information services for safe and secure parking places for trucks and commercial vehicles. Static data (e.g. location information, total number of parking places for trucks) should be accessible through a national or international access point, while Member States are responsible for establishing and managing a single NAP containing dynamic data (such as the availability of parking spaces).

At the request of Member States, the Commission has also set up a European Access Point for truck parking data, accessible through the European Union Open Data Portal[36], providing also a visual overview through the TENTec Portal[37]. This European Access Point is complementary to the National Access Points and Member States can publish their truck parking data either on the European or the National Access Point, or on both.

At the date of writing of this report (30 November 2018), thirteen countries have set up operational NAPs for truck parking information and/or published their data on the European Access Point. However, the extent of the data available is quite variable. For example, some NAPs offer a limited amount of dynamic data, whereas others only provide static data. The remaining countries are still in the design/development phase of their NAP. Five Member States have decided not to take any action as they consider that the Delegated Regulation is not applicable due to the absence of safe and secure parking information services.

3.4. Priority area IV: Linking the vehicle with the transport infrastructure

As stipulated in Annex I of the ITS Directive, priority area IV is focused upon ITS applications on open in-vehicle platforms and the development and implementation of cooperative systems including vehicle-to-vehicle, vehicle-to-infrastructure and infrastructure-to-infrastructure communication.

Priority area IV has two actions specified in the ITS Directive:

- The definition of necessary measures to integrate different ITS applications on an open in-vehicle platform.
- The definition of necessary measures to further progress the development and implementation of cooperative (vehicle-to-vehicle, vehicle-to-infrastructure, infrastructure-to-infrastructure) systems.

[35] Commission Delegated Regulation (EU) No 885/2013 of 15 May 2013 supplementing ITS Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles - OJ L 247, 18.9.2013, p. 1

[36] http://open-data.europa.eu/en/data/dataset/etpa

[37] http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html

Many new research and deployment activities have been reported in priority area IV, in particular for C-ITS, leading to a catch up with other priority areas for many countries.

The work in this area is still in the early phases of deployment. Early pre-deployment projects (e.g. the C-ITS corridor Rotterdam-Frankfurt-Vienna, SCOOP@F, NordicWay) have been used to further develop the policies and standards required to ensure interoperable cooperative systems across the EU, which are being further harmonized and deployed through the C-Roads platform and projects supported by the Connecting Europe Facility (CEF).

Progress since 2014

The following reported examples demonstrate the type of work and progress in this area:

- **The C-Roads[38] Platform** was developed to address interoperability needs noted in the summary of the analysis of the 2014 national reports. The Platform gathers national and cross-borders projects and aims to address the lack of harmonisation and standardisation in C-ITS deployment, which was considered a key obstacle to EU-wide deployment and interoperability. The Platform enables and encourages collaboration between the existing C-ITS projects that are taking place in some Member States, and facilitated the agreement of common standards and specifications for these and future projects. The core countries involved includes Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Netherlands, Norway, Portugal, Slovenia, Spain, Sweden and United Kingdom. Associated members (Ireland, Switzerland) are involved in projects conducted by core members, as well as some associated international actors such as Austroads, an Australian road transport association.
- Several C-ITS EU Research Projects, involving many local authorities and other actors, were reported, in particular **C-Mobile, CO-GISTICS, COMPASS4D, Auto C-ITS**. These projects look at diverse aspects of C-ITS (e.g. improving safety for urban areas, truck logistics in cities in terms of energy efficiency, enhancing interoperability for autonomous vehicles). The projects are run at EU level rather than in specific regions. Involvement in these projects is considered a lower level of activity than the nationally driven projects identified above, but are still important contributors to the priority area IV actions.

3.5. Other initiatives / highlights

Besides projects within the four priority areas, many countries also included details of other projects that did not sit clearly within one of the priority areas. These included projects in rapidly developing ITS themes, such as vehicle automation and Mobility as a Service (MaaS), as well as in areas not covered by the ITS Directive (but covered by the ITS Action Plan) such as electronic tolling.

[38] https://www.c-roads.eu

The most frequently reported ITS themes in the 2017 national reports are listed below – these are accompanied with selected examples of projects:

- **Mobility as a service (MaaS)**

The new Finnish Act on Transport Services forces key stakeholders to open their information and ticketing interfaces which in turn enables aggregation of various mobility services into comprehensive, attractive and cost-efficient offerings brought to the customers by Mobility as a Service operators (MaaS operators). Finland mentioned many pilots and activities and the emergence of several MaaS operators. France, Netherlands and Spain also mentioned work in this area, while Sweden has developed a MaaS roadmap and set up the KOMPIS (Combined Mobility as a Service) pilot project (2016-2020).

- **Driverless vehicles**

Sweden has started DriveMe (2014 onwards), the world's first large-scale autonomous driving pilot project, with first pilot cars on Gothenburg roads in 2017. Sweden also created a Strategic Vehicle Research and Innovation partnership (2016 onwards - €90m/year) within the public-private FFI ((Fordonsstrategisk, Forskning och Innovation), which funds R&D that focuses on energy, environment, safety and automation.

Portugal and Estonia reported setting up autonomous vehicle expert groups. Estonia has also made it possible to operate self-driving vehicles in the country, as long as a driver is present. Several other countries such as Belgium, Finland, Germany, Netherlands, Spain and United Kingdom also reported on legal frameworks for testing or for autonomous vehicle trials. France, Germany and Luxembourg launched in September 2017 a cross-border collaboration project that aims at facilitating the development and experimentation of automated and connected driving technologies in relation to intelligent transport systems and electric mobility.

- **Drones in transport**

Netherlands has begun to investigate the use of drones for traffic monitoring and surveillance.

- **Electronic tolling**

Portugal, as part of the OPTIMUM project (proactive charging schemes for freight transport, 2015-2018) has tested variable pricing for freight vehicles, with calculations based on real-time transport network conditions. This is aimed to reduce congestion and improve environmental conditions.

Greece also reported several electronic tolling projects, spanning several stretches of motorway.

- **Smart city projects**

Finland has carried out several "smart city" projects in major cities across the country. These have aimed to use increased connectivity to deliver better transport systems.

- **Knowledge sharing initiatives**

France launched the Mobilité 3.0 initiative, which aims to bring together all actors within the smart mobility sector to facilitate knowledge exchange and accelerate deployment.

- **Data security, protection and liability issues**

Netherlands has set up the Smart Mobility Community for Standards & Practices. This aims to facilitate cooperation and knowledge sharing so that Smart Mobility solutions can be implemented at a larger scale.

4. KEY PERFORMANCE INDICATORS (KPIS)

For the first time in 2017, a section on KPIs was included in the Commission's common template for the ITS national reports. As noted earlier in this report, reporting of KPIs has been mixed, with not all Member States providing information. A summary of the values reported by type of indicator (deployment, benefit or financial) is presented in the next sections.

An assessment of the progress made has not been carried out because KPIs were not reported in previous years' reports and it has not been possible to derive KPIs based on the information available in previous reports.

4.1. Deployment KPIs

Deployment KPIs were provided by 12 countries (Austria, Belgium, Czech Republic, Denmark, Greece, Spain, Finland, Hungary, Ireland, Netherlands, Norway and Sweden) in their national reports. However, not all countries provided information for all seven deployment KPIs, with the least reported indicators being freight information (5 countries).

Some countries broke down the KPIs into different categories. For example, the KPI for information gathering infrastructure/equipment was broken down into: weather monitoring (Denmark, Finland, Sweden), traffic volume (Finland, Sweden), permanent fixed traffic monitoring (Denmark), temporary fixed traffic monitoring (Denmark) and mobile/probe traffic monitoring (Denmark) and travel time (Finland). In some cases, KPIs (such as incident detection) were disaggregated into tunnels and the rest of the road network.

The level of disaggregation by road type also varied. Some countries provided KPIs for the whole TEN-T road network, while other countries provided individual KPIs for varying degrees of disaggregation (for example, combinations of TEN-T network, TEN-T core, TEN-T comprehensive, other motorways, urban roads).

Due to the limited number of countries reporting on KPIs, it is difficult to use these to gain an accurate picture of ITS deployment across the EU. The broad definitions of each KPI and the variability in how the KPIs were reported also make comparisons between countries more challenging, particularly due to the different levels of disaggregation chosen by Member

States, with many KPIs showing a range of values between 0% and 100%. Some useful conclusions could nevertheless be drawn specifically for deployment KPIs.

This section provides a short summary (by KPI) for the twelve countries that reported deployment KPIs (a table summarising the KPI values for each Member State can be found in annex I).

Information gathering infrastructure/equipment (road KPI)

Reporting of this KPI varied significantly across Member States, with some providing more detailed information than others. For example, some countries (Austria, Denmark, Finland, Sweden) decided to break the KPI down into several sub-categories (such as cameras, weather monitoring, permanent fixed traffic monitoring, temporary fixed traffic monitoring, mobile/probe traffic monitoring and traffic volume services), while other countries (Belgium, Spain, Greece, Netherlands) did not provide a breakdown by ITS service. However, the available information indicates that the TEN-T network in the reporting countries generally has a high level of coverage of information gathering infrastructure (above 75%).

Incident detection (road KPI)

Coverage of the TEN-T network with ITS used to detect traffic incidents varied significantly among Member States that reported on this KPI. The values reported ranged from 0.4% (Denmark) to 100% (Netherlands, Hungary) for the TEN-T network, with the remaining countries somewhere between these values. Two countries provided a separate KPI for incident detection in tunnels (Austria - 100% of 381 km - and Denmark - 80% of 6.1 km), while some countries (Finland and Sweden) specified values for manual and automated incident detection.

Traffic management and traffic control measures (road KPI)

The national reports indicated that the deployment of ITS to enable traffic management and control measures varies considerably among countries. All countries reported on this KPI for the TEN-T network, high-level road network, or motorways, apart from Sweden, which only provided a value for urban roads. The values reported ranged from 0% (Ireland motorways and TEN-T comprehensive) to 100% (Netherlands), with a range of values in between these. Sweden reported a KPI of 27% for urban roads. In addition, Denmark provided values for tunnels (100% of 6.1 km).

Cooperative-ITS services and applications (road KPI)

Half of the reporting countries did not provide a C-ITS KPI or provided a null value, considering that technology was only at pilot stage even if sometimes numerous pilot projects were in progress. For the other countries, the values reported were low except for Finland. Denmark also noted that the KPI is intended to be for road-based ITS infrastructure, while the main project in the country (NordicWay) is based on cellular communication technology and so has no road-based infrastructure.

Real-time traffic information (road KPI)

Compared to other KPIs, the reporting of real-time traffic information was relatively consistent for the all countries. Coverage was generally very high, with all countries reporting 100% for the TEN-T road network, apart from Greece and Ireland. The Czech Republic also provided detailed information by type of service.

Dynamic travel information (multimodal KPI)

Four countries (Belgium, Czech Republic, Hungary and Norway) did not report on this KPI. For the other countries, the method of reporting varied, with some countries providing values for transport nodes and/or the TEN-T network. Sweden also disaggregated the data by nodes with fixed devices (13%) and by nodes with mobile devices (100% coverage), while Ireland disaggregated the data by nodes of road and rail. The values reported for transport nodes ranged from 27% (Austria) to 100% (Denmark, Greece, Ireland for rail,), while the values for the TEN-T network ranged from 13% (Greece) to 100% (Austria, Denmark, Finland, Ireland, Netherlands).

Freight information (multimodal if possible, or road KPI)

Five countries reported on this KPI (Belgium, Czech Republic, Denmark, Netherlands, Spain) and all values were close to 100% for the TEN-T road network. Only the Czech Republic provided a multimodal KPI and approximated that 60% of transhipment sites for combined transport modes are covered by information services. Denmark reported that the number of nodes could not be calculated.

112 eCalls (road KPI)

Member States were not asked to report on this KPI, as the related information will be provided regularly through another channel, i.e. the yearly COCOM (Communications Committee) questionnaire on the implementation of the 112 number[39]. To be noted that, as first vehicles equipped with the 112 eCall system only hit the roads by the second half of 2018, significant figures should only be reported as from 2019.

4.2. Benefit KPIs

In total, four countries (Finland, Germany, Netherlands and Spain) provided benefit KPIs. Of these, Finland was the only country to have provided KPIs for each of the three categories (travel time, road safety and CO_2 emissions), based on estimates made for the projects NEXT-ITS and NEXT-ITS 2 (travel time benefit calculations for public transport are based on a national travel survey and a report on a journey planner for the region of Helsinki). In addition, Sweden provided estimations based on a socio-economic model. Benefit KPIs were generally reported based on the results of pilot projects (as recommended in the description of KPIs), rather than for the road network as a whole. In the future, it is hoped these may allow for extrapolation to network and/or EU level.

[39] Annual report 2017: https://ec.europa.eu/digital-single-market/en/news/implementation-european-emergency-number-112-results-eleventh-data-gathering-round

In addition to the recommended indicators, Germany also provided the following benefit KPIs: capacity improvement, stabilisation and improvement of the traffic flow, and increase of performance and capacity. The Netherlands also presented results from the evaluation of several of its pilot projects and calculated cost-benefit ratios (e.g. for time-savings). Their report also suggested that additional KPIs may be more relevant in the future to better track the transition to and the impacts of more intelligent transport systems.

Change in travel time (road KPI)

Finland reported on this KPI based on recent project experience, which showed a 1.1% improvement in travel time as a result of ITS for road transport, and 15.3% for public transport (with the assumption that all public transport users use the services). Netherlands provided analysis of the impact of various measures on congestion from 2005-2015: a 9% improvement in travel time was attributed to ITS specifically thanks to ramp metering and dynamic route information, in addition to benefits from existing traffic management measures implemented before 2000.

Change in road accidents results in death or injury (road KPI)

Reporting on this KPI was variable and different levels of disaggregation were offered by each country. Finland estimated a 14% decrease based on recent project experience, Germany a 30% accidents decrease. Spain reported detailed figures (before and after ITS implementation or improvement) for interurban roads and urban roads, with contrasted results: strong improvement for interurban roads (e.g. 56% less fatalities, 31% less accidents with victims), bad results for urban roads (e.g. 68% more fatalities, 26% more accidents with victims) – these figures may deserve additional analysis, in particular regarding the typology of victims (e.g. VRUs in urban areas),the type of deployed ITS and possible other factors influencing these evolutions. Sweden did not produce a KPI but provided indicative savings based on project experience[40].

Change in traffic-CO_2 emissions (road KPI)

Finland was the only country to report on this KPI and provided a figure of a 1.2% decrease, based on recent project experience. Sweden did not provide a KPI but gave estimations based on calculations from a socioeconomic model of CO_2 emissions[41].

4.3. Financial KPIs

In total, eight countries reported financial KPIs (Czech Republic, Germany, Greece, Spain, Finland, Ireland, Netherlands and Sweden). Again, the level of detail provided for each KPI varied depending on the country. For instance, some reports detailed several categories of

[40] Between 2014-2016, 400 new cameras along around 1000 km of road network saved the lives of four people according to assessment by the Administration.

[41] Based on socioeconomic models, CO_2 emissions are estimated to have decreased by 24,566 tonnes during 2014-2016 thanks to ATK (400 road safety cameras along around 1000 km of road network).

annual operating costs, including roadside equipment maintenance, development and maintenance of ITS services and traffic management centre operations.

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

The amount invested by Member States reporting on this KPI was within a range from around 2% in average for Greece to 12% for the Netherlands. However, the Greek national report also mentioned that the spend on ITS for the major motorways ranged from 1.5% to 32%, which perhaps indicates that this rate, for some individual sections of the network, may be artificially high if investments on the road infrastructure were done previous to the investments on new ITS equipment, and therefore the costs of ITS equipment were only compared to other annual maintenance or infrastructure rehabilitation costs or to the costs of other electromechanical equipment..

Annual operating and maintenance costs of road ITS (in €/km network covered)

The numbers reported by three of the countries (Finland, Spain, Sweden) were very consistent and ranged from €3,700/km to €4,000/km. Other countries reported different values: €13-15,000/km for Czech Republic for its 7,480 km of motorways and 1st category roads (but 90% of which related to tolling costs, so only €800-900/km for other ITS), between €1,000-1,500/km and €24,700/km for two motorways in Greece (the highest value may be due to tolling as well), and €800-€1,300/km for the TEN-T network in Ireland.

5. CONCLUSION

This second series of progress reports has provided the European Commission and the Member States with further information on the ITS implementation all over Europe.

For the first time, Member States were proposed to use a new common reporting template and to provide a series of KPIs on deployment, benefits and financial aspects. In addition, they were invited to provide all reports (one on the ITS Directive, three on delegated regulations) in a single delivery using the common reporting template. This was meant to facilitate both the reporting and the analysis of the reports.

This goal has been only partially achieved; as for previous reporting exercises, the delivery of the reports spanned over one year, with only one third of the reports provided in time and less than half of the reports based on the proposed common template. However, around two-thirds of the Member States used the opportunity to provide a unique report covering all four reporting obligations.[42] A handful of reports were very succinct and even much less detailed than in 2014, sometimes leading to lower scores being assigned.

[42] *Note: it also happened that information on the implementation of specifications was provided twice (and even differently), both in the ITS national report and in a specific specifications-related report.*

The general trend is a positive evolution of the deployment of ITS at national level, for all four priority areas. This positive evolution was supported by activities involving several Member States and benefitting from EU funding support, or where EU legislation mandated deployment and/or provided for legal and technical certainty through common specifications. Progress has been specifically visible in priority area III for eCall and in priority area IV with a lot of activities related to pre-deployment of C-ITS.

Many reports illustrated the positive impact of projects involving several Member States and funded under the Connecting Europe Facility on the effective and harmonised deployment of ITS services and on the harmonised implementation of the different Delegated Regulations (with still efforts needed for some late Member States), which calls for continued efforts in that respect. However, several Member States are still late or did not provide information regarding the deployment of their National Access Point, and there is still one issue regarding the deployment of the eCall infrastructure.

Similar conclusion can be drawn with regard to the Member States' cooperation on the elaboration of common tools related to the accessibility of data and provision of services, in particular through CEF-funded projects and Programme Support Actions (e.g. DATEX II profiles, TN-ITS specifications, metadata catalogue, quality framework etc), improving also the accessibility of ITS data and therefore supporting also the development of new ITS services.

Several active Member States took also the initiative to develop together technical documents (e.g. metadata catalogue, quality framework) to support the implementation of the specifications and shared these documents with the other Member States. This proved to be beneficial to support a harmonised implementation of the specifications.

This cooperation brings positive results and should be encouraged and extended, and may benefit from a more formal recognition of the National Access Points forming the backbone of a digital ITS infrastructure.

40% of the Member States + Norway provided figures for KPIs, at least partially. Although not optimal, this allows to draw some conclusions for the contributing countries, at least regarding deployment: a very high level of coverage of information gathering infrastructure and of real-time traffic and freight information services on the TEN-T road network, a more limited coverage for other services. Benefit and financial KPIs were reported less frequently, which was to be expected as this information may need more investigations and/or data collection over a longer period.

Some Member States deemed relevant to report on topics not in the current scope of the ITS Directive. This may be taken into account when reflecting on the scope of a possible future revision of the Directive.

6. SUGGESTIONS FOR NEXT PROGRESS REPORTS

In the light of the analysis of the 2017 national progress reports, the following remarks can be made:

- Further efforts to streamline the reporting for the ITS Directive and the Delegated Regulations would be welcome, in order to facilitate the reporting and the analysis. This may be taken into account when revising the Directive and/or the Delegated Regulations and when adopting new delegated acts. A revision of the Directive may also be an opportunity to possibly establish improved reporting requirements (e.g. reporting structure, KPIs etc).

- On the basis of the received information, evaluation and knowledge-sharing activities could be organised to further guide Member States on data collection and calculation of KPIs, beyond the already provided guidance, also taking into account the need for stability of the definition of these KPIs to be able to assess their long-term evolution.

Annex I – KPI values for each reporting Member State

KPI type	KPI	Austria	Belgium	Czech Republic	Denmark	Finland	Germany	Greece	Ireland	Netherlands	Norway	Spain	Sweden
Deployment	**Information gathering infrastructures / equipment (road KPI)**	87,5% of 2,199km high-level road network can be technically observed with the equipped cameras. (Status: Q1/2017)	100% of TEN-T core 87% of comprehensive network 50% of other motorways	9 maps showing rather comprehensive coverage of the comprehensive TEN-T network by several infrastructures	Weather monitoring: 100% of 1603 km of TEN-T road network Permanent fixed traffic monitoring: 9% of 1603 km Temporary fixed traffic monitoring: 2% of 1603 km Mobile/probe traffic monitoring: 100% of 1603 km	Road weather and traffic volume services = 100% of 5,207 km TEN-T road network Travel time services = 15%	No information provided	77,6% of 2119 km motorways	Weather and Environmental Conditions: 100% of the road network Traffic Conditions: Main corridor: 30% Core TEN-T: 24% Comprehensive: 4% Motorway: 0 Other sections: 0	100% for 1000km of TEN-T 100% for 1400 km of other motorways (8.300 kilometres of road in total)	6,9% of TEN-T and national roads (real time travel time registration)	TEN-T core: 78% of 5794 km TEN-T comprehensive: 49% of 6152 km Other national roads: 20% of 34337 km	TEN-T core: 78% of 5794 km TEN-T comprehensive: 49% of 6152 km Other national roads: 20% of 34337 km
Deployment	**Incident detection (road KPI)**	17% (381 km of tunnels / 2199 km of high-level road network)	100% of TEN-T core 79% of comprehensive network 58% of other motorways	4,6% of motorways	6.9/1603 km = 0.4% For tunnels, 4.9/6.1 km = 80%	Manual incident detection = 100% of 5,207 km TEN-T road network	No information provided	53,2% of 2119 km motorways	National Roads Main Corridor: 30% TEN-T Core: 24% TEN-T Comprehensive: 4% Motorways: 0% Other Sections: 0% Outside National Roads South Dublin County Council: 5% Dun Laoghaire-Rathdown County Council: 35% Limerick City & County Council: 35%	100% for TEN-T 100% for other motorways	TEN-T and national roads 1,2% for automatic detection based on cameras	TEN-T core: 46% TEN-T comprehensive: 24% Other national roads: 6%	On 558 km of urban roads: i) Automated for fixed equipment: 27% ii) Automated for mobile equipment: 45% On TEN-T roads: iii) For manual incident detection: 100% (from police, emergency service, phone-calls etc)
Deployment	**Traffic management and traffic control measures (road KPI)**	19% (820 km / 4400 km)	57% of TEN-T core 42% of comprehensive network 26% of other motorways	4,5% of motorways	Permanent installation: 174/1603 km = 9% Temporary installation: 28/1603 km = 2% Tunnels: 6.1/6.1 km = 100%	12% of 5,207 km TEN-T road network	No information provided	71,7% of 2119 km motorways	National Roads Main Corridor: 1% TEN-T Core: 1% TEN-T Comprehensive: 0% Motorways: 0% Other Sections: 0%	100% for TEN-T 100% for other motorways	5% of TEN-T and national roads	TEN-T core: 73% TEN-T comprehensive: 52% Other national roads: 20%	On 558 km of urban roads: 27%
Deployment	**Cooperative-ITS services and applications (road KPI)**	2% (50 km of C-ITS equipped sections / 2,199 km)	0% of TEN-T core 0% of comprehensive network 0% of other motorways	5,7% of motorways	0% + pilot NordicWay covering all Denmark based on cellular communication	29% of 5,207 km TEN-T road network	No information provided	1,7% of 2119 km motorways	No information provided	0% - mostly pilots	No C-ITS services deployed	TEN-T core: 11% TEN-T comprehensive: 3% Other national roads: 0%	Only early pilot projects
Deployment	**Real-time traffic information (road KPI)**	100% (2,199km / 2,199km)	100% of TEN-T core 100% of comprehensive network 100% of other motorways	RDS-TMC system on 100% of the core network. The core network is roughly 60% covered by information portals LED information trolleys are used for approximately 48 km, which is 4% of the core road network (1222 km in total).	1603/1603 km = 100%	100% of 5,207 km TEN-T road network	No information provided	52,7% of 2119 km motorways	National Roads TEN-T Core: 33% of 373 km TEN-T Comprehensive: 13% of 543 km Motorways: 44% of 73 km Other Sections: 0% Outside National Roads: South Dublin County Council: 12% of 950 km Dun Laoghaire-Rathdown County Council: 10% of 135	100% for TEN-T 100% for other motorways	100% (whole network)	TEN-T core: 100% TEN-T comprehensive: 99% Other national roads: 100%	17,354 km (national roads and highways): 100%
Deployment	**Dynamic travel information (multimodal KPI)**	100% (2.199km / 2.199km) high-level road network - 27% of transport nodes (e.g. rail or bus stations) (10.000/ 37.000)	No information provided	No information provided	Provision of dynamic travel information: 1603/1603 km = 100% Number of nodes covered: 13.766/13.766 nodes = 100%	100% of 5,207 km TEN-T road network	No information provided	13% of 2119 km motorways + 100% of Attiki (capital region) public transport network (6400 km) + 100% of transport nodes (7400)	Roads Dun Laoghaire-Rathdown County Council: 2% Limerick City & County Council (National roads):0% Limerick City & County Council (Regional roads): 4% Bus stops: 6% of 12000 stops Rail Luas Light Rail Network (excl Luas	100% for TEN-T 100% for other motorways	Information available on APIs and on stops and terminals in many cities. KPI is not calculated because services not linked to roads and road length.	TEN-T core: 26% TEN-T comprehensive: 14% Other national roads: 4%	i) 98% of 37,893 km of urban network ii) 13% of 23870 nodes via fixed devices (signs) , 100% via mobile devices (apps, website)
Deployment	**Freight information (multimodal if possible, or road KPI)**	No information provided	99% of TEN-T core 91% of comprehensive network 95% of other motorways	Static information on rest areas, number of parking spaces and on services : 100% of the core road network. Approx 60% of transhipment sites for combined mode transport covered by information services.	1603/1603 km = 100% Number of nodes was not able to be calculated.	No information provided	No information provided	No information provided	Nothing specific to freight	Parking space information on 100% of TEN-T 100% of other motorways	No information provided	TEN-T core: 100% TEN-T comprehensive: 100% Other national roads: 100%	No figures provided
Benefit	**Change in travel time (road KPI)**	No information provided	No information provided	No information provided	No information provided	Estimated road transport KPI 1 = ((188.4-186.4)/188.4)*100 = 1.1% Estimated public transport KPI 2 = ((65.5-55.5)/65.5)*100 = 15.3%	No information provided	No information provided	No information provided	9%, from 2005-2015, only for ramp metering and dynamic route information	No information provided	not enough information available to obtain a real KPI.	No information provided
Benefit	**Change in road accidents results in death or injury (road KPI)**	No information provided	No information provided	No information provided	No information provided	Estimated based on NEXT-ITS and NEXT-ITS2: KPI = ((712-611)/712*100 = 14.2%	30% less accidents	No information provided	No information provided	The introduction of the lane control system in the past, which now covers almost half of the motorways, reduced the number of head-tail collisions and injuries by 30%-40%.	No information provided	Interurban roads: Accidents with victims: 31% Accident victims: 7% Fatalities: 56% Seriously injured: 51% Slightly injured: -1% Urban roads Accidents with victims: -26% Accident victims: -24% Fatalities: -68% Seriously injured: -22% Slightly injured: -29%	No information provided
Benefit	**Change in traffic-CO2 emissions (road KPI)**	No information provided	No information provided	No information provided	No information provided	Estimated based on NEXT-ITS and NEXT-ITS2: KPI = ((3834-3788)/3834*100 = 1.2%	No information provided	No information provided	No information provided	Not calculated	No information provided	not enough data available to obtain a real KPI.	No information provided
Financial	**Annual investment in road ITS**	No information provided	No information provided	Telematics - investments (including tolls) of the SFDI 2015: 1.91% of €730,3m 2016: 3.47% of €750,7m	No information provided	6,5% of €107m of road investments on the TEN-T	Only figures for investment in traffic control measures are available (investment separated by motorway (BAB) and federal roads (B) 2014: €35.0 Mio (BAB), €2.9 Mio (B), 2015: €28.4 Mio (BAB), €0.5 Mio (B), 2016: €37.7 Mio (BAB), €0.2 Mio (B)	Average of 2.2% of total infrastructure for 5 main motorways (range between 1.5-32%)	Transport Infrastructure Ireland - National Roads (absolute figures, no percentage) 2014 - 1,931,860 € 2015 - 1,721,251 € 2016 - 1,320,374 €	12% (€164m) for total expenditure on ITS and Dynamic Traffic Management (estimated based on figures provided in NL report)	No information provided	8,60 M€	Approx. 6% (i.e. ~ €46m/year over the period 2014-2017)
Financial	**Annual operating & maintenance costs of road ITS**	No information provided	No information provided	Motorways + 1st category roads 2015: 13,370€ / km 2016: 15,199€ / km	No information provided	3,760 euros/km (excludes costs of HVAC-systems, tunnel safety systems, electricity, tunnel lightning and traffic lights)	No information provided	Data for 2 motorways (2017): - Egnatia odos: 1000-1500 EUR/km - Attiki odos: 24,700 EUR/km	Transport Infrastructure Ireland - National Roads Operating and Maintenance costs of road ITS Total O&M costs 2014 - 1,456,462 € 2015 - 1,767,459 € 2016 - 1,090,828 € O&M Costs for Main/Core/Comprehensive TEN-T Network (1385 km) 2014 - 1052 €/km 2015 - 1276 €/km 2016 - 788 €/km O&M Costs incl National and Secondary road network (5679 km) 2014 - 256 €/km 2015 - 311 €/km 2016 - 192 €/km	See above	No information provided	KPI = 4000 €/km (for 15000 km of roads)	€3,700/km/year for the 6391 km of TEN-T over the period 2014-2017