Directive 2010/40/EU Progress Report 2023 *LATVIA*

13.12.2023.

1 Introduction

1.1 General overview of the national activities and projects

Including national ITS legislation and strategies since 2021 to 2023 is a breakthrough period in Latvian ITS domain, as the targeted EU co-financed project "NAP implementation" and the related legal and administrative issues.

As general digitalization concept has arisen and has a consequent support from the Latvian political level, it strongly contributes ITS related issues (inc. the first steps in C-ITS and CCAM domains). Thus, the most notable (on-going or planned) sectoral programs and projects of especially high national or regional investment capacity have a link to ITS or such embedded components as follows:

- deployment of EU-type railway node *Rail Baltica* (2030, MMTIS);
- Latvian motorways' program (2030-2040, RTTI, SRTI, SSTP);
- complex modernization of Riga intercity electric train system (2025, MMTIS);
- deployment of the national e-ticketing platform for public transport (2025, MMTIS);
- 5G passive infrastructure deployment along the E67 route *Via Baltica* (2027, C-ITS);
- new and modernized the main urban nodes of Riga inner motorways' system (2030, RTTI, SRTI);
- multi-directional facilitation of less or zero emission road traffic fleet and infra (2030, RTTI).

Latvian general national ITS strategy (as a broad research toolkit, not politically binding statements) was developed in 2017 and NAP deployment plan was approved by the Government in 2020. After reaching the closest milestone (e.g., operational NAP platform and proper data flow through it, as the first and basic step towards ITS national deployment) and looking for the latest new EU incentives in ITS field (especially in C-ITS and MAAS domains), probably general ITS strategic considerations are to be revised and reset for the period from 2026 (when all the binding requirements of ITS directive 2010/40/EU are to be satisfied).

By the way for now Latvia has no such natural ITS accelerators as globally oriented CCAM industry (vendors, developers); excessive (or at least enough) public investments in transportation sector; challengeable high population density and urban expansion, thus, we're looking at ITS domain very practically. That means Latvian interests in ITS field faces such signs, as:

- high cost-benefit effect;
- technological maturity (esp. ready-to-use solutions);
- the widest targeting to society;
- geographical and technical scalability;
- long-lasting effect (the extended life cycle and possible transition to future mobility, up to 2050).

1.2 General progress since 2020

Latvian NAP deployment is almost done (to be completed till the end of 2023). More information about the project is available at https://lvceli.lv/celu-tikls/projekti/projekti-ar-es-lidzfinansejumu/transporta-nozares-informacijas-nacionala-piekluves-punkta-izveide/ .

Working on our NAP relatively late, let us to implement hopefully all the best binding practices, especially NAP user-oriented with following characteristics:

- metadata structure accordingly to Mobility DCAT-AP methodology;
- various opportunities of service subscription (download, API, MQTT), giving access to all possible formats for certain data category, e.g. not just EU type publication, but also another (.json, .csv) and any proprietary, if such exist;
- NAP web portal performance and ergonomy (public section and the authorized users' cabinets);
- possible third-party road traffic data input through the NAP operator's system (instant access);
- Latvian NAP to be a single access point for all the 4 EU ITS services.

Latvian State roads, ltd. (further LSR, national road administration) has Ministry of Transport of Latvia delegated power to implement and then operate NAP, also being the initial and main data provider to NAP (RTTI, SRTI and SSTP for the state road network of 20 thousand kilometres in total, whereas all the Latvian public road network is of about 70 thousand kilometres overall length).

LSR is ready for the administrative transition to proceed turning from project to process approach from 1 January of 2024. Initially Latvian NAP team will work as a part of LSR traffic information centre. Three persons (involved in NAP deployment) will start to work permanently and LSR will provide effective organizational integration to support routine operations for effective NAP task management.

Moving towards the operational NAP, Road Traffic Law was amended, regarding the full transition of ITS directive to the national legislation (before that, just terms and general considerations of ITS were mentioned only). Actual legal issues to be solved in 2024 are following:

- adoption of the Cabinet Regulations, setting up data provision obligations to NAP, related to SSTP, RTTI, SRTI and MMTIS services (working version will be ready in the end of 2023);
- provision of all the necessary delegated function (authorization and resources) from Ministry of Transport of Latvia to LSR for NAP operation and further development;
- nomination of IDRO, according to the AFIR.

Since the national legal acts on obligations for NAP data providers planned to come in force in the first quarter of 2024, LSR as NAP operator plan to provide extensive initial effort to build up constructive relations with all possible NAP data providers, especially the significant ones (municipalities, emergencies, public transport operators etc).

We're waiting (and facilitating) for enrichment of NAP platform by all the relevant data (also not specified for EU-wide ITS services) and forming stable Latvian ITS community around that core till 2026, necessary for the next level development.

1.3 Contact information

Ministry of Transport of the Republic of Latvia (national body), Gogola str.3, Riga, Latvia, LV-1743, satiksmes.ministrija@sam.gov.lv; person in charge: Viktorija Tabakurska, viktorija.tabakurska@sam.gov.lv

Latvian State roads, ltd. (NAP operator), Gogola str.3, Riga, Latvia, LV-1050, lvceli@lvceli.lv; person in charge: Diana Tumene, diana.tumene@lvceli.lv

2 Projects, activities and initiatives

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

2.1.1 Description of the national activities and projects

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

NAP (as technological platform and initial set of services) is at the last implementation phase and operation planned from 27 December 2023. Details mentioned above in the general chapters and available on the given links.

Within the NAP deployment project, also the LSR internal system for data flow provision to NAP established. The project is realized with notable cost-savings (17%) from the initially planned ones. Some facts about Latvian NAP performance as follows:

- information systems are of microservice architecture, basically open source developed (modules can be transferred to NAP partners);
- NAP performance is web portal, transportdata.gov.lv for unauthorized users (everyone can use GIS mapping service of the published data) and authorized (data submission and subscription);
- all the NAP user-oriented features are covered by in-depth UX/UI measures to consider the best EU practice and be maximum user – friendly and EIP compatible;
- some data (of similar nature as for LSR business processes) may be put in LSR system directly (authorization or third-party workspace), then reaching NAP from this pipeline (ready-to-use option for certain data providers);
- Datex transformation engine is NAP built-in core (based on LSR business case from .json), thus it is an option for some data provider to get to NAP without direct Datex publications.

2.1.2 Progress since 2020

Description of the progress in the area since 2020:

Accordingly, to the above-mentioned information.

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

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

The first MMTIS NAP publications are awaited in 2024, accordingly to the legal acts (will come in force soon). The first package will have up to 10 static data categories (NeTeX publications), managed by the state public transport client authority (Road Transport Administration). Other notable players in field (public transport operators in the biggest municipalities) probably will come on that base. Thus, MMTIS data availability is awaited as follows:

- the “easiest” (already existing in different formats, f.i. schedules, stops etc.) static data will come for the whole possible geographical coverage.
- static data to be extracted and properly managed (generally doesn’t exist) then to be turned to NeTeX publications for NAP publications.
- dynamic data availability is to be evaluated case by case (f.i. e-ticketing is the most important here) and is highly depending on the service level of such mobility mode, then the available SIRI publications are to be forwarded to certain the corresponding NAP service socket.

"Service socket" approach on NAP side is needed to perform statistics gathering and quality control measures of EU ITS services. NAP NeTeX socket is ready to use and need to be configured just for the real use-cases of data processing. As NAP operator (LSR) doesn't work in MMTIS field, there is more limited options to facilitate the external data input than direct publication to NAP.

MMTIS data categories (of variable case-specific data sets) planned to be available in NAP till the end of 2024 are as follows (static, NeTeX) for the network of regional public transport according to Regulation 2017/1926 Annex are as follows:

Level of service 1:

a. Location search (exc.POI)

b. Trip plans

d. Trip plan computation (exc. connection links, planned interchanges, accessibility of access nodes and existence of assistance services).

Level of service 2:

b. Information service

c. Trip plans, auxiliary information, availability check.

Level of service 3:

a. Detailed common standard and special fare query.

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

All facets of data scope to be validated for the compliance to ITS directive and EIP proposed methodologies.

Linking of travel information services:

Our concept is NAP as a basement for proper data exchange, but complicated end-user services such Maas should come from market to compete and encourage ITS community.

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

The on-going process matches the ultimate deadlines of ITS directive.

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

The single access point for RTTI, SRTI, SSTP and MMTIS is in use.

Additional information (e.g. have metadata catalogues been implemented?):

Mobility DCAT-AP is initially implemented. Considering the certain differences of MMTIS model-based data schemes from the Datex ones, we see various adjustments needed to metadata catalogue when real MMTIS data input to NAP will come.

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

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

Progress made in terms of the accessibility, exchange and re-use of the road and traffic data types set out in the Annex:

LSR has revised available RTTI/SRTI data scope for the EU requested geographical coverage and the rest of the state network within the NAP deployment project, having such planned status on 27 December 2023 (launching of NAP):

- 19 RTTI data categories published for the state road network.
- the same data from automated (roadside telemetry and traffic signals, fleet management etc.) and manual (data processing in control centres) sources are to be separated to different publications for better NAP client service.
- LSR has a configurable in-built interpretation and validation tool for the own automated data to provide measurements' transformation to RTTI/SRTI discrete status and data anomaly check.

External RTTI (also SRTI) data can reach the NAP in 3 possible ways and such variety is very important for the initial service rise:

- 1.option (basic) – direct Datex publication to NAP.
- 2.option (for LSR institutional partners) – data input to LSR system as a cooperation function (data is uploaded by LSR, seems to be used mainly for emergent information) or third-party workspace (targeted on municipalities, which has managing responsibilities along the main road traffic routes of ITS directive's coverage).
- 3.option (probably suitable for big municipalities) – LSR like data direct input to NAP for JSON→Datex transformation phase and consequent NAP publication.

Geographical scope and the road and traffic data content of real-time traffic information services and their quality, including the criteria used to define this quality and the means used to monitor it:

All the NAP published RTTI/SRTI data services have such performance indicators:

- based on the well-established (existing) data acquisition principles.
- data, forwarded to NAP through LSR gateway has embedded internal QA functionality.
- all the data sets are to be controlled by embedded tools, regarding to the formal publication requirements (conformance to data schema etc.) on NAP side.
- all the published data are covered by the publisher's self-declaration approvals.

According to the network's functional hierarchy, data availability and level of scale, LSR provides to NAP all the relevant existing data, that means full geographical coverage of the state road network (not just TEN-T, primary roads, and urban nodes). All the data volume rising measures beyond the scene are quite natural, e.g. complex infra projects with more ITS devices (f.i. PPP E67 Kekava bypass, launched in 2023), better processes and institutional cooperation to digitalize another data and especially – IoT domain (LSR has pilot implementations of road data mining from fleet management systems).

No specific network-wide activities (excl. NAP deployment and road asset management) are going on or planned, targeted mainly to the more data acquisition, but such opportunities generally arise as a side effect from the road construction and maintenance. The only exclusion is EU co-financed ITS project of wide consortium MERIDIAN, where LSR is working for modernization (from direct to remote sensing principle) of traffic counting system for the state road network.

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

All facets of data scope are to be validated for the compliance to ITS directive and EIP proposed methodologies. No details to be reported now.

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

The single access point for RTTI, SRTI, SSTP and MMTIS is in use.

Where relevant, a description of changes to the priority zones:

No different approach from EIP methodology.

Additional information (e.g. which data types are being provided? Have metadata catalogues been implemented? Are quality requirements being checked?):

Some principles already mentioned in MMTIS chapter. For the single NAP we provide as uniform approach for all the ITS services' management, as possible. NAP has a position data administrator for supervision of the published services. Working procedures are in progress in accordance with NAPCORE and EIP recommendations. As far, as possible all the QA measures are to be automated in data flow, but for the rest spot checks are planned. We also hope to get extensive data users' contribution, as their virtual cabinets have direct access to complaints and NAP operator has extensive automated and manual modes for immediate rejection or cancellation of invalid data publications.

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

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

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

SRTI topic was solved along with RTTI. 8 SRTI data categories are processed to NAP (having one data publication for each principal data source). For instance, slippery road notification may arise from 3 different sources, forming different NAP publications. We adopt the main QA criteria to be published within the data sets (event's probability and impact on road traffic).

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

No results to be reported.

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

No changes to be reported.

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

Considering SRTI related negotiations, it is clear, that many of the involved actors (data sources, as f.i. Police, Rescue, national railroad operators) are highly interested in the closest institutional cooperation with LSR, as they aren't ready and don't wish to be independent SRTI data providers to NAP. Thus, the proper choice to get all these actors' data to NAP is more extensive center-to-center cooperation, while data from the qualified source is to be processed through LSR traffic information centre, getting to LSR data flow to NAP. Such process generally exists, but to be formalized in 2024. It will be encouraged by the on-going reform of emergency hotlines, whereas all the requests and notifications will be processed through unified 112 service (also E-call is based there).

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

2.2.1 Description of the national activities and projects

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

Some projects towards advanced traffic management system (ATMS, variable message signs, telemetry, centralized algorithms etc.) mentioned in the previous report. All the announced measures are successfully implemented, having ATMS on 2 TEN-T routes of mainly spot, but also one 28km long section-type /with 3 subsections/ implementation. ATMS data is to be available in NAP within the RTTI service package. There are also some new cores urban infra projects with coordinated ATMS elements. The national motorways' program has a target to let driving speed up to 130km/h, that means quite dense ATMS installations for variable speed limits and traffic warnings.

2.2.2 Progress since 2020

Description of the progress in the area since 2020:

Deployment of the Latvian-Estonian joint ITS project Smart E263/E77, completed in the end of 2022. More information is available on following link: https://lvceli.lv/en/road-network/projects/interreg-projects/smart-e263-e77-2/

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

2.3.1 Description of the national activities and projects

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

Same related incentives (projects) were implemented and still on-going towards the automated traffic enforcement for traffic safety and security applications, namely:

- LSR has developed the 1 phase (16 sections) of distance-based speed control (combined with automated checks of all the traffic regarding the technical inspection, insurance, and road fee issues) along the state roads in 2023 (the numbers of sections planned to multiply);
- 2 weigh-in-motion WIM stations installed in TEN-T routes, using for pre-selection of overloaded vehicles in 2021 (overall, 3 in operation). We've plans for gradual expansion of WIM system.
- e-service for abnormal transportation permits issue modernized in 2023;
- many different pilot implementations of roadside ITS equipment was in Latvia in the previous 3 years, still doesn't have enough maturity or effect for straightforward scalability (red light enforcement, prevention system against animals' presence on road, over speeding screens etc).

2.3.2 Progress since 2020

Description of the progress in the area since 2020:

Traffic safety issue has special attention also on political level, national traffic accident statistics is stagnating and need to get new driving forces towards gradual improvements.

2.3.3 112 eCall (priority action d)

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

E-call is fully operational in Latvia since 2017. Operator is a State Fire and Rescue Service, PSAPs infrastructure is technically linked to 112 line.

Additional information:

No additional information

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

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

No certified SSTP still in Latvia. There are planned 2 parking of gold label to be implemented along E67 route till the end of 2023, but seems not to be ready. More information about this commercial project: https://e67parking.lv/index.php?highlight=6&sitepage=Eu_co_financing . To adopt NAP functionality, dataset about the existing one (but still not formally certified) is available as NAP STTP publication. In such way we've one EU-harmonized Datex data scheme, included both static data categories.

There is no distinctive lack of appropriate truck parking along the Latvian TEN-T road network, but in fact they aren't go through the SSTP certification process, probably due to their own commercial reasons. This isn't actual just for historical e. g. distinctively non-complied parking, but also tens of quite modern ones, cauterized with fuel stations and available for fee.

Considering the scope of actual needs, decision was made to avoid direct public investments there, but to facilitate private incentive in the field of SSTP. The current situation is as follows: truck parking service along TEN-T is available on quite different performance and probably seems satisfied for the experienced users, but it is not classic SSTP service, complemented by NAP data publication.

Percentage of parking places registered in the information service:

There is no data on SSTP, but on 200+ LSR registered parking places at the state roads are published as relevant RTTI dataset (POI location) with the binding remark about the conditional service level.

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

No one such SSTP still exist, however both planned on E67 are to be announced with dynamic data provision.

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

Latvian NAP is managing also SSTP data (single access point to all EU ITS data services) and waiting for the data input. Taking into account quite modest number of SSTP foreseen in Latvia for the 10-year perspective (also respecting the latest geopolitical considerations of notable shrinkage of East-West corridor cargo), their static data are to be given to NAP through the centralized data management by LSR, however dynamic data, similarly to all the rest NAP related real-time data will come to NAP only as specified third party data services (ready to use publication). QA of such dynamic data will be challengeable for Latvian NAP during the forthcoming development cycle.

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

2.4.1 Description of the national activities and projects

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

The pilot implementations are in place to test CCAM elements and rise institutional awareness in the field when such activities are complemented by EU support. LSR is participating in the research project "Augmented CCAM, more info: AUGMENTED CCAM - Latvijas Valsts ceļi (lvceli.lv).

Although Baltic memorandum on the deployment of regional C-ITS corridor along E67 was signed 5 years ago and its mobility role just raised up for that period, no well-coordinated regional activities or even preparation followed. The following activities are in place, planned or foreseen on Latvian side:

- AUGMENTED CCAM project (till 2025.) will provide 1km short test bed for autonomous driving (planned also V-to-X interface with direct access to NAP data service);
- Regarding to the 5G Via Baltica Corridor there are several projects financed by Connecting European Facility (CEF):
    - Approved by EC in 2022 - "5G Corridor Study for Latvia, Estonia and Lithuania" (01.01.2022. – 31.07.2023.) and on-going "5G Northern Europe Transport Corridors" (2022-2025; active 5G infrastructure);
    - project under preparation in cooperation with Estonia and Lithaunia to submit in CEF call by 20.02.2024. (optical cables).
- Some municipalities already done or planned tests to autonomous shuttle buses in partly isolated traffic environment (although no instant deployment foreseen there).

Description of the progress in the area since 2020:

All the C-ITS activities are to be done in strongly compliance with the respective EC specifications.

2.5 Other initiatives / highlights

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

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

There is an interest, pilot implementations, activities and plans to deploy even more multifunctional solutions, where ITS is just one of the target domains or a side product, getting on board (also to NAP publications) as more available relevant mobility data, as possible, f.i.:

- video surveillance for public order supervision, using LSR roadside technological infrastructure with multi-sectoral AI analytics.
- extensive use of IoT input, as target measurements (from fleet management) and crowd-source input.

2.5.2 Progress since 2020

Description of the progress in the area since 2020:

National motorways' program is in its initial phase (feasibility studies, design, and land acquisition), thus now there are no TEN-T sections, fully compatible with the respective criteria, to be reached for such infra type. That's why for the report's KPI section we use not just our data and the proposed methodology, but also the relevant assumptions by the context.

3 Key Performance Indicators (KPIs)

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

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

3.1 Deployment KPIs

3.1.1 Information gathering infrastructures / equipment (road KPI)

Figures to be provided by type of network / zone.

Figures to distinguish fixed and mobile equipment.

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

- Length of road network type / road sections (in km) equipped with information gathering infrastructures & Total length of this same road network type (in km):
  approx.: 850km of TEN-T network, 30km of primary roads, 50 km of urban nodes.
- KPI = (kilometres of road network type equipped with information gathering infrastructures / total kilometres of same road network type) x 100
  50% (variable density, but mainly spot-type with a gap of 10-20km between each other).

3.1.2 Incident detection (road KPI)

Figures to be provided by type of network / zone.

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

- Length of road network type / road sections (in km) equipped with ITS to detect incident & Total length of this same road network type (in km):
  30km of TEN-T network.
- KPI = (kilometres of road network type equipped with ITS to detect incident / total kilometres of same road network type) x 100
  2% (2 spot and 1 section installations).

3.1.3 Traffic management and traffic control measures (road KPI)

Figures to be provided by type of network / zone.

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

- Length of road network type / road sections (in km) covered by traffic management and traffic control measures & Total length of this same road network type (in km):
  70km of TEN-T network.
- KPI = (kilometres of road network type covered by traffic management and traffic control measures / total kilometres of same road network type) x 100
  8% (4 sections and tens of spots covered by ATMS).

3.1.4 Cooperative-ITS services and applications (road KPI)

Figures to be provided by type of network / zone.

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

- Length of road network type / road sections (in km) covered by C-ITS services or applications & Total length of this same road network type (in km):
  0 km (just 1km test bed within the research project).
- KPI = (kilometres of road network type covered by C-ITS services or applications / total kilometres of same road network type) x 100
  0%

3.1.5 Real-time traffic information (road KPI)

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

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

- Length of road network type / road sections (in km) with provision of real-time traffic information services & Total length of this same road network type (in km):
  70km of TEN-T network.
- KPI = (kilometres of road network type with provision of real-time traffic information services / total kilometres of same road network type) x 100
  8% (assumption, where road devices/VMS/ are combined with RTTI data availability, the rest network has covered just by data, where available).

3.1.6 Dynamic travel information (multimodal KPI)

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

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

- Length of transport network type (in km) with provision of dynamic travel information services & Total length of this same transport network type (in km):
  0 (different non-NAP services exist).
- Number of transport nodes (e.g. rail or bus stations) covered by dynamic travel information services & Total number of the same transport nodes:
  0 (different non-NAP services exist).
- KPI = (kilometres of transport network type with provision of dynamic travel information services / total kilometres of same transport network type) x 100
  0%
- KPI = (number of transport nodes with provision of dynamic travel information services / total number of same transport nodes) x 100
  0%

3.1.7 Freight information (multimodal if possible or road KPI)

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

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

- Length of road network type / road sections (in km) with provision of freight information services & Total length of this same road network type (in km):
  0 (different non-NAP services exist).
- Number of freight nodes (e.g. ports, logistics platforms) covered by freight information services & Total number of the same freight nodes:
  0 (different non-NAP services exist).
- KPI = (kilometres of road network type with provision of freight information services / total kilometres of same road network type) x 100
  0%
- KPI = (number of freight nodes with provision of freight information services / total number of same freight nodes) x 100
  0%

3.1.8 112 eCalls (road KPI)

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

Operational at full range.

3.2 Benefits KPIs

3.2.1 Change in travel time (road KPI)

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

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

0,95% (average for the realized projects).

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

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

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

- Number of road accident resulting in death or injuries before ITS implementation or improvement:
  N/A (different traffic safety assumptions for different projects).
- Number of road accident resulting in death or injuries after ITS implementation or improvement:
  N/A (general positive effect observed, even without formal ex-post evaluation).

3.2.3 Change in traffic-CO2 emissions (road KPI)

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

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

3% (average for the realized projects).

3.3 Financial KPIs

ITS includes any types of systems and services altogether.

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

2% (annually uneven and depend on the projects' portfolio for certain period).

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

Approx. 1000Eur/km (for the most significant road network).