Traffic Information Services for Traffic Management

Fact Sheet

Introduction

The CEDR TNM WG Fact Sheet on Traffic Information Services for Traffic Management Systems (TIS/TMS) is based on the proceedings and outputs of the 4th CEDR Traffic & Network Management (TNM) Working Group TIS/TMS Workshop held at Cracow on 22-23 May 2019 and the 5th CEDR TNM Working Group on Traffic Information and Guidance for Traffic Network Management and Data for TIS/TMS held in Rome on 28-29 October 2020. The draft version of the Fact Sheet has been updated in September 2022 and later in March 2023 into the current final version.

The scope of the TIS/TMS fact sheet is limited to the needs and requirements of NRAs towards TIS impacts on traffic management services highlighting NRAs' policies and requirements for data sharing and quality assurance with other public and private service providers in terms of partnerships, data exchanges and agreements and data quality and highlighting best-practice assessment results discussed in the working group. The aim is to summarize experiences with focus on impacts and factors related to TIS provision and give recommendations and arguments for NRAs to integrate TIS with TMS.

The Fact Sheet will not include basic concepts or technical deployment guidelines, as these guidelines are well known and published, e.g. the EasyWay ITS Deployment Guidelines Within the framework of the European ITS Platform (EU EIP)[1], co-financed by the European Commission, the ITS Deployment Guidelines, which were developed in previous projects (EasyWay, EIP+), were fundamentally revised to further harmonise the technical and organizational implementation of ITS in Europe. The ITS Deployment Guidelines including TIS deployment guidelines are all integrated and updated into by the Reference Handbook for Harmonised Core ITS Service Deployment in Europe (https://www.its-platform.eu/achievement/reference-handbook/). In addition, a good overview of Traffic and Travel time information services can be found in CEDR Task Group T12 report Traffic Management to reduce congestion (http://www.cedr.eu/download/Publications/ 2013/T12_Traffic_management.pdf).

The CEDR TNM WG 4th and 5th TIS/TMS Workshops' minutes and presentations are available on the CEDR website in the members' area (www.cedr.eu).

Definition of Traveler Information Services

Traveler Information Services (TIS, as defined in the EasyWay TIS Deployment Guidelines, are designed to provide the European traveler with comprehensive and credible real time traffic information allowing for well-informed travel decisions before the journey (pre-trip information) and during the journey (on-trip). They include real-time information concerning the Trans European Transport Network (TEN-T), interfaces with peri-urban networks and other transport modes, especially in urban areas (see TIS Deployment Guidelines under EU EIP Platform).Such a definition of TIS will be used throughout this Fact Sheet.

[1] With the support of the European Commission under the CEF program, the EU ITS Platform (https://www.its-platform.eu), active 2016 till 2021, is the place where Member States, road authorities, road operators and partners from the private and public sectors cooperate to encourage, accelerate and optimize ITS deployments in Europe in a harmonized way.

Conclusion and Main Position of WG TNM on TIS for TMS

1. NRAs need to continue to play a main role in traffic management and providing data content and processing within the traffic information chain. Traffic management as a service requires focus of NRA on interfaces, service quality and responsibility. Quality, quantity, and timeliness of information are key requirements for the effective implementation of robust TIS/TMS services.
2. Many NRAs provide their own traffic information and guidance services and apps and complementing missing data or increase quality of data through partnerships and arrangement with public and private partners. Few NRAs, as Danish Road Directorate, have switched strategy through transferring all traffic information services to private partners.
3. The full removal of Variable Message Signs on the roads in favour of available 'in-car travel guidance' is not recommended in the short- and medium-terms. In addition, there needs to be consistency in all data channels provided.
4. TIS services that are related to real-time and forecast traffic conditions and road services to improve network efficiency and road safety on motorways are very important to NRAs.
5. There is a need to ensure proper quality and quantity of source traffic data as key requirements for the effective implementation of robust local, national, and especially cross-border ITS information and management.
6. The current legal and organizational framework governing the functions of road network management in Europe is largely not adaptive for public-private partnerships in traffic information and guidance. The need exists for developing a consistent legal framework for cooperation between road operators and private service providers.
7. Data quality by other players are not subject to external quality assessment in most cases, hence the need for closer collaboration and service level agreements on the basis of data quality indicators corresponding to specific needs of services. Quality requirements as part of service level agreements between public and private service providers need to be integrated in cooperation models.
8. Setup of National Data Stores or Warehouse (NDW) could realize and optimize effective traffic management and consistent deployment of TIS linking all stakeholders and data across modes and networks through public-public and public-private partnerships . In compliance with EU Delegated Regulations, National Access Points (NAP) have been set up in most EU countries .
9. NRAs are recommended to share knowledge regarding the points above and also coordinate and cooperate whenever it is possible and relevant.

TIS Deployment and Organization Recommendations: NRA Perspective

A-TIS Services: Trends and Implications on NRAs

i. Main objective of NRAs is to get the proper message to the end user in a proper and timely manner to ensure smooth and safe traffic flows on their networks. NRAs will continue to play a main role in providing data content and processing within the traffic information chain. TMC/NRAs are no longer in the lead in all areas but is still a part of the system. Keeping the road users well informed of the traffic situation still plays an important role in traffic management and safety.

ii. NRAs are legally bound for ensuring traffic safety, traffic regulations and network efficiency of traffic services on their networks and take into account the consequences for **all** road users and to some extent also the neighbours to the road infrastructure. There is still a need for NRAs to provide their own traffic information and possibly guidance services and apps and complementing missing data or increase quality of data through partnerships and arrangement with public and private partners.

iii. TIS services that are related to real-time and forecast traffic conditions and road services to improve network efficiency and road safety on motorways are most relevant to NRAs with interface to neighbouring road networks, urban networks, public transport, and freight.

iv. Private service providers are taking over a bigger part of data collection, processing and service provision through the use of advanced mobile sensor and crowd-sourcing technologies enabling them a wider data coverage, even with sometimes occurring data quality issues and sometimes with a much narrower customer focus than NRAs.
v. This trend of many NRAs providing their own traveller information services or at least traffic data will continue in the near future, in the light of a wide-spread network level efficiency outcomes of TIS from other public and private stakeholders. At the moment, smart phone-based, vehicle-based, radio traffic service, road-side based traffic information media or a combination of the above are the best means to reach a wide audience of road users. In the future, the connected vehicle environment has the potential to reach out more effectively, but it is not assessed to be widespread in a coordinated way to the whole vehicle fleet in the short or medium term.
vi. As NRAs, we should focus more on the opportunities that new parties/technologies bring on than focus on the threats. Try to look at it from a service provider point of view, align with that and they may already help NRAs. It is worth to take the perception that private Service Providers have a set of traffic management instruments in their portfolio, that can contribute to the aims of the NRAs. Getting access to these instruments and having them operated in line with NRAs' aims is not necessarily for free, just like the traditional TM instruments have their costs. With an adequate mix of digital and physical TM tools, the total cost of effective traffic management could be lowered. The challenging part is how and when to adapt and to determine the order of what shall be changed and implemented to enable the most effective above mix. At the same time, NRAs will be expected to make the adaption/transformation with improvements of the current TM service level provided to road users by NRAs. It will also be necessary to sort out the distribution of the costs for development, implementation, and maintenance/operation between public and private stakeholders.
vii. NRA's need a closer dialog with service providers to identify how quality of traffic information can be improved, and how it can be made available for road users with shorter delay. NRA's should also exchange obtained experiences with service providers and the lessons learned regarding improvement of the quality of data.
viii. It is suggested that NRA's join forces in getting more private service providers to make at least their relevant traffic safety related data available on the National Access Points (NAPs). That will improve all service providers safety related traffic information and make more road users benefit from it.
ix. Cooperation Models are a necessity. Countries as Netherlands have set up a national data warehouse (NDW) for effective traffic management and consistent deployment of TIS linking all stakeholders and data. In some European countries, national platforms are set up for cross-network, inter-modal across public-public and public-private partnerships. National databases or web portals are set up for standardized data sharing and consistent info use between all key stakeholders in a smart and efficient way.
x. C-ITS has not yet started to impact greatly the operations and systems in Traffic Centres. However, NRAs are getting prepared for Day 1 C-ITS services in the near future.
xi. Most NRAs share information for support of cross-border TM with neighbouring countries through direct agreement or through national access points.

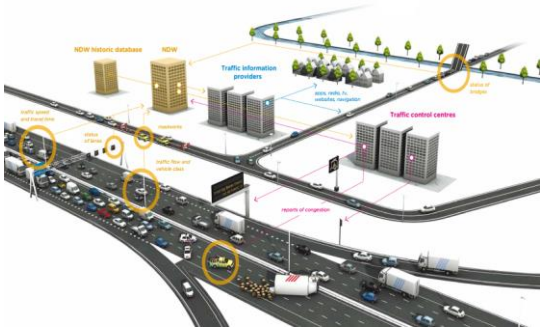
B-Organisation of TIS interface to TMS:

i. NRAs are the main leaders and competent authorities in directing and managing traffic on the main road network.
ii. To complement data and increase quality and enhance internal operations, road operators have started partnerships with private stakeholders through data share agreements (e.g. NL) or through direct purchase of required data for internal use by NRAs as in Sweden. Data has a PRICE between private and public. Data quality should have resources to ensure the proper data quality for the type of service at hand and relevant traffic conditions. NRAs should invest in ensuring data quality. EETS and European EU ITS Platform are good references for data quality assessment.

iii. There is an interest by private traffic info services to cooperate with NRAs provided the necessary agreement model and framework are spelt out in detail and a clear business case is developed for both parties for WIN-WIN results with a resulting WIN for end users.

iv. Several model data share contracts or commercial arrangements between NRAs and other providers exists. It depends upon the type, scarcity, quality of data and the type of services served by the data. Service agreements with thresholds and quality measures of data is not standard.

v. There needs to be a more standard way of setting up and operating national access points beyond NRAs leading the setup and operations in terms of NAP linkage to national and regional data warehouse platforms and how to handle network different NAPs when dealing with trans-national entities. The National Access Point Coordination Organisation for Europe (NAPCORE) project was started to address this challenge from summer 2021 onwards, aiming to coordinate and harmonise more than 30 mobility data platforms across Europe (https://napcore.eu/)



NDW in Netherlands

VAO, ASFINAG

TIS for TMS : NRAs Best Practice Knowledge

During the workshops, best practice on TIS for TMS knowledge and results were presented and exchanged between the participating NRAs. In general, TIS integration into TMS offers advantages for a better network performance due to:

- Improved network efficiency
- Decrease of congestion
- Benefits on traffic safety
- Improved reliability of traffic management measures
- Positive impacts on driver behaviour and the drivers' ability to make more informed decisions.

Netherlands

On the basis that data should be provided at the right quality and quantity, a National Road Traffic Data Portal for traffic information on Dutch roads (NDW) was set up that also serves as NAP for the Netherlands. NDW was set up as an alliance of 19 national, regional, and urban authorities to contract the procurement and sharing of traffic data from more than 19 service providers under service contracts. The objective is to serve as central traffic data source for all authorities and guarantee timeliness and uniformity in quality and quantity of traffic data information to end users through standardisation of data and processes coupled with legally sound agreements to ensure Win-Win aspects.

NDW network covers real-time data on traffic situation, events and road works as well as activated road-side control and information deployments on 3.400 km motorway (100% of all motorway network), 4.300 km trunk roads and 3.000 km urban roads with over 37.000 measurement sites and 42 seconds maximum latency in data provision. NDW serves the national TMC/TIC as well as 5 regional TMCs and 3

urban TMCs in the Netherlands and serves as the central data portal to provide service providers with the output information from the associated traffic management centres with regard to road-safety and traffic management measures.. For all data categories, data structure is based upon DATEX II and published via webservices push and pull to more than 200 companies and authorities (users) either under open data conditions, or under contractual agreements with regard to service levels and reciprocal service provision arrangements to use the information.

Future expansion of NDW include connection to Dutch smart mobility projects as Amsterdam Practical Trial, Socrates 2.0, Concorda, C-ITS Corridor and Talking Traffic. To ensure a level playing field for all data providers, all data sources are merged and anonymized within the National Data warehouse (NDW) before dissemination to public and NAP publication. Data quality parameters are developed to govern the interchange of traffic data from various sources within robust business models between public and private service providers. Traffic data quality criteria include 99% high availability, and low latency of 42/75 seconds.

Belgium Flanders

TIS/TMS services supplied to users and operated by road agency in Flanders include: Website www.verkeerscentrum.be, Twitter, RDS-TMC, DATEX II feed and VMS. TIS include real-time traffic information and road work information on the whole road network including motorways and secondary roads. Data sources include NRA's own sources from loops and cameras as well as police reports and FCD data on congestion and travel time on certain road sections from private companies and freely available traffic information from service providers.

Other TIS services in major urban centres in Flanders include www.slimnaarantwerpen.be, a web portal covering travel information services in Antwerp and in Ghent at stad.gent/mobiliteit-openbare-werken/mobiliteit/verkeerscentrum-gent. Both portals provide co-modal travel information as well as web, dashboard and twitter service to road users and have agreements with several private service providers as Waze and Coyote to provide traffic and disseminate traffic information. Data is acquired and fused from different sources, mostly free of charge at a mutual exchange basis with service providers with some exception of purchased data on a commercial basis as in the Antwerp traffic information portal. SLAs on data quality need to be ensured and DATEX II is the most likely data exchange standard proposed between the different players. NAP is established(www.transportdata.be). Trends in TIS include traffic management as a service (TMaaS) being implemented in Ghent and to be replicated in other cities.

The Antwerp pilot, within the SOCRATES 2.0 project, aims to optimize traffic flows through seeking optimal distribution in daily person vehicle traffic among 2 tunnels on two routes in Antwerp. The traffic is shifted from the main route tunnel to the second alternative tunnel route through reduced toll incentive administered through a voucher system operating in real-time to attract drivers to divert. Pilot started in October 2019 and has been operational until end 2020 with cooperation of road operators and service providers. Evaluation is currently being finalized, impact assessment results for such an innovative tolling reduction incentive are not yet publicly available.

Sweden

As background, Swedish Transport Administration (STA) has been cooperating with service providers some years, however the interest from the service providers varies. STA's main focus in this field lies on traffic information while the service providers of course have other concerns as well. Traffic information from STA follows the DATEX II format and holds a relatively good standard. STA also provides traffic information according to more easy accessible APIs.

Trafficdata.se is the Swedish national traffic data portal and constitutes the NAP. Established in 2016 as metadata portal, it covers the Sweden TEN-T network and has approximately 1000 users and covers 44

data sets for real time traffic information, road works and traffic safety information. Next step is to link Trafficdata.se to public transport information portal found at https://www.trafiklab.se/. STA currently develops a general portal for secure and harmonized data exchange in order for customers to get an easy-to-use one-stop-shop for all our data and to enable secure access to external data for our own needs.

Beside internally generated traffic information data, STA uses external data sources include vehicle generated data, travel times from INRIX, crowd-sourced data from Waze and weather information. Data from external sources are internally used by Swedish Transport Administration for traffic management, maintenance, and planning.

A study was conducted by STA to compare traffic information data quality between STA and different service providers as Waze, Google, TomTom, HERE and Inrix regarding in road closure events. The conclusion of such assessments was that the results between the different providers are many times random. STA's data delivery has not been designed in a format that can be interpreted by the service providers in a sufficient way. Work needs to be done to create accurate information for the service providers and there must be further analysis to underline the causes. Further analysis is currently in progress.

Denmark

A national traffic web portal (www.trafikinfo.dk) is maintained by Danish Road Directorate (DRD) disseminating real-time traffic information as well as traffic events, road works, weather information and webcams on motorways and parts of the municipal roads. The web portal also covers commercial freight transport services and real time winter maintenance service – including status on bicycle routes. DRD buys real-time GPS data COWI (March 2020 onwards) for internal use and to generate real-time and historic 'live' traffic information on www.trafikinfo.dk. Other travel info channels include Twitter, RDS-TMC, live TV on occasion, an email-service regarding "special events", a special radio station map, VMS on roads, bridges and in tunnels. Danish Road Directorate (DRD) takes the initiative and has a leading role in providing national TIS and maintains and hosts the National Access Point (NAP) (https://du.vd.dk/). The information on the Danish NAP is provided in XML-formats, where DATEX II is the standard format regarding safety related traffic information. DRD has cooperation with public stakeholders (police, municipalities, emergency services, traffic radios) and private service providers. DRD frequently tests private services providers' displaying of DRD traffic information data. Parameters as correct event identification and latency are assessed. Further cooperation between DRD and private service providers and further tests will continue in the future focusing on attaining high data quality and good meta data and to improve use of relevant data formats and standards. With the upcoming new Traffic Management System DRD has a strong focus on following the standards for Datex II, in order to make it easier for the service providers to use the traffic information from DRD. There is little focus on regional services and public transport, so here other stakeholders must take the initiative. In Denmark, results from an annual user survey on traffic information conducted in March 2022 showed that radio broadcasting of traffic information still is the most popular source of traffic information during the journey followed by car navigation systems and Google Maps.

Finland

Finnish Transport Infrastructure Agency (FTIA) is responsible for traffic management in Finland. FTIA procures traffic management services from a state-owned (100 %) special assignment Traffic Management Company Fintraffic Ltd. with partnership agreement.

Fintraffic Road is responsible for road traffic management and technology on 78,000 Km of roads. The services offered by Fintraffic Road include operational traffic management in Traffic Management

Centres, taking care of technical systems for road tunnels and variable road signs, road weather systems as well as all related information technology and telecommunications services. TIS/TMS services supplied to users include: Website https://liikennetilanne.fintraffic.fi/en, Twitter, DATEX II feed and VMS. TIS/TMS services cover whole public road network in Finland. Fintraffic maintains and hosts the NAP (https://FINAP.fi/#/en). The information on NAP is provided in XML-formats, where DATEX II is the standard format regarding safety related traffic information.

The future of traffic systems is depended on vehicles and the infrastructure becoming more intelligent and connected and data availability and smooth delivery through an integrated platform is key.

Austria

Besides the usual radio traffic information broadcasting and private service providers as Google and TomTom, Verkehrsauskunft Oesterreich - VAO (Traffic Information Portal Austria) provides traffic information across national-motorway/transport mode/region/urban/cross-border networks on a door-to-door basis. A routing information service (RIS) within VAO covers all motorways, national roads, urban roads, public transport, bicycle, and pedestrian paths. The critical issue is determining the proper data quality for the allocated use of specific traffic information service and how reliable is the traffic information coming from service providers. Quality assurance is made on local detector data as well as quality analysis of travel time data reported by private service providers. Data quality comes at a price.

In addition, the EVIS-AT project aims at an Austrian wide generation, harmonization, and exchange of traffic information in real time using new data sources as fleet FCD and operating a 24/7 clearing centre for traffic messages and data exchange.

Hungary

National TCC/TIC managed by Hungarian Public Roads is responsible for traffic information collection and dissemination on the whole interurban road network. Main data sources are road-side equipment measuring traffic flows and weather information. The TIC hosts the national road databank and serves as data portal, DATEX hub. Traffic information distribution channels include Roadside VMS, Website, Social Media, Mobile App, Radio Broadcast, RDS TMC and ETSI G5 (C-ITS). Cooperation with external partners is ensured through cross-border agreements with neighbouring countries as well as agreements with private service providers as TomTom, here and Waze. Under EU funding and Crocodile project, Hungarian Public Road provides and hosts the NAP for information on traffic conditions (www.nap.kozut.hu). Coverage is for all road networks including urban roads. Future expansion includes C-Roads, macroscopic traffic modelling and update of national TMC.

Slovenia

National Traffic Information Centre (PIC) was established in 2006 and managed by Slovenian Motorways Company (DARS) in cooperation with DRSC (Slovenian Road Agency) for the Ministry of Transport covering all national roads in Slovenia, including motorways and regional roads. DARS is leading the integration of TIS and TMS through a special application for provision of real-time traffic, incidents and road works traffic information (www.promet.si). Such an application constitutes the main interface to the NAP for Slovenia with full public operation under DARS and DRSC. In addition, cross-border traffic information with neighbouring countries is handled to enable uniform delivery of ITS services on main international road corridors. The national TIS is free of charge public service. Most source data are public authority data with some data as FCD provided by private service providers through data share agreements.

Switzerland

Traffic information messages within the so-called "National Roads Network" (roads of national significance) are created and maintained by the National Traffic Management Centre, VMZ-CH. The

cantonal police forces and three regional traffic management centres take this responsibility for cantonal and urban roads. All participants use a common specialised application for this purpose. sharing information basing on DATEX standards. The National Traffic Information Centre VIASUISSE AG is preparing the traffic information messages editorially, spreads them to radio stations and provides data to other service providers. It is also taking care that urgent information ("Priority 1" messages) are highlighted where required, e.g. that local radio programmes are interrupted to inform about critical issues. VIASUISSE also feeds a special website collecting relevant traffic information for heavy goods vehicles (Truckinfo.ch).

Greece

Through regional TMCs, real-time traffic information is collected via traffic detection equipment, weather sensors, police patrols and user reports. Communication to road users is done through VMS, radio bulletins and website. Traffic detection points are situated on all entry and exit points as well as every 2-3 Km in addition to incident detection inside tunnels. For future trends, Greek roadway operators are implementing and testing C-Roads platforms on test sites for cooperative road services.

Italy

On Italian motorways, The Road Safety Information Coordination Centre (CCiSS), is the Operational Centre that collects, manages and disseminates information on traffic emergencies and conditions at national level. Content providers and service operator of CCiSS are both public and private entities. Data is exchanged between ANAS and CCiSS via DATEX II. As NAP, CCISS provide on trip services giving information about real time traffic conditions in relation to congestion, works and accidents and on weather condition and enforcement limitations and pre-trip services giving information about weather, work and peak period forecasts and enforcement limitations. CCiSS information dissemination channels are TV, radio, RDS-TMC, webservices and dedicated public telephone information. ANAS provides its network users with travel information via radio bulletins, specialised Apps, public service number and road-side VMS (www.stradeanas.it/it/info-viabilit%C3%A0/vai).

For future, ANAS is actively planning services based upon C-ITS and real time management via Internet of Things to incorporate road infrastructure with new sensor and communication technologies.

Poland

Road monitoring points in addition to currently 16 regional TICs established by General Directorate for National Roads and Motorways (GDDKiA) collect national road status data (traffic status, road works and construction) and transmit it to all road users and mass media 7 days a week for 24 hours via dedicated number 19 111. Other TIS services on urban roads and regional roads are maintained by regional and urban authorities. GDDKiA serves as National Access Point to information on traffic conditions (NAP).
However, level of use of information from others is very low. Only 2 Data Providers from city road authorities contribute or use information up to now only. Possible integration with TMS is in preparation stage as part of the National Road Traffic Management System on TEN-T (NRTMS) EU financed project.

More information can be found in the following links:

- EasyWay TIS Deployment Guidelines updated and integrated under the EU EIP Platform Reference Handbook for Harmonised ITS Core Service Deployment in Europe http://www.itsreferencehandbook.eu/

- Austria TIS:
  https://www.verkehrsauskunft.at/

  http://www.evis.gv.at/index_en.html

- Netherlands TIS:
  National Data Warehouse: www.ndw.nu/en/
  Amsterdam Practical Trial: www.praktijkproefamsterdam.nl/en
  Socrates 2.0: socrates2.org

- Flanders TIS:
  www.verkeerscentrum.be

  www.slimnaarantwerpen.be

  stad.gent/mobiliteit-openbare-werken/mobiliteit/verkeerscentrum-gent

  www.socrates2.org

- Sweden TIS:
  trafikverket.se

- Denmark TIS:
  www.trafikinfo.dk

- Finland TIS:
  https://liikennetilanne.fintraffic.fi/en

  https://FINAP.fi/#/en

- Slovenia:
  www.promet.si

- Italy:
  www.stradeanas.it/it/info-viabilit%C3%A0/va

- Hungary:
  www.nap.kozut.hu

Recommendations and Next Steps

It is of value for NRAs/CEDR countries to exchange and discuss experiences, partly to learn from each other and partly to get closer to a more harmonised approach that will benefit all NRAs and in the end also road users.

The workshops on traveller information services for traffic management systems showed the necessity, advantages, and the success of sharing, exchanging, and discussing experience, knowledge, and best practice examples.

The following recommendations for continuing the work were developed in the 4th and 5th CEDR TNM TIS/TMS Workshops:

- Many NRAs need to continue to play a main role in traffic management and providing data content and processing within traffic information chain..
- Many NRAs provide their own traffic information and guidance services and apps and complementing missing data or increase quality of data through partnerships and arrangement with public and private partners. Some NRAs have switched strategy through transferring all traffic information services to private partners

- The need exists for developing a consistent legal and organizational framework for cooperation between road operators and private service providers. NRA's join forces in getting more private service providers to make at least their relevant traffic safety related data available on the National Access Points (NAPs)
- National Databases need to be strengthened to include most key players and to ensure standardized data sharing and consistent info use between all key stakeholders in a smart and efficient way.
- Traffic management as a service requires focus of NRA on interfaces, service quality and responsibility. Quality and quantity of information are key requirements for the effective implementation of robust TIS/TMS services.
- Data quality by other players are not subject to external quality assessment in most cases, hence the need for closer collaboration and service level agreements on the basis of data quality indicators corresponding to specific needs of services. NRA's need a closer dialog with service providers to identify how quality of traffic information can be improved, and how it can be made available for road users with shorter delay.
- It would also be beneficial for both road users and road authorities if NRAs continue international cooperation regarding TIS and share experiences and best practice solutions.

Contribution

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CEDR TIS/TMS Cracow and Rome Workshops' minutes and presentations are available in the Members' Area under WG3.3 on the CEDR website (www.cedr.eu).