

# **The future of a Common European Mobility data space Reflection paper**

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## Key messages

This document is quite extensive and gives an overview on the TN-ITS data space aspects. These key messages should help the reader to focus on the main content of the paper:

- 1) TN-ITS is an **end-user driven** data sharing platform. It focusses on the data priorities, necessary to fulfil the end-user needs on related mobility applications and services. On the short term the focus of TN-ITS is to significantly contribute to ISA (Intelligent Speed Advice) and the European strategy 'Vision Zero'.<sup>1</sup> On the longer term, TN-ITS is a very necessary data sharing methodology to support automation. It is essential that end-users are aware and recognize the differentiating value of TN-ITS data sharing mechanism from other competitive offerings in the market.
- 2) The main goal of TN-ITS is **to ensure that the related public authorities create and make data available, with the highest quality** to support the end-user needs. The strive for data availability, accessibility and quality is **a public-private joint effort**.
- 3) In an international EU-wide context, TN-ITS is based upon the **CEN TC 278 WG7 standardization**, ensuring compatibility, complementarity and harmonization with other data sharing mechanisms in the complete mobility data space.
- 4) TN-ITS's **main differentiator** is the **data trust**, originating from the public authorities, as the root of trust in each of the member states' road network.

The text below will detail all aspects of these key messages, in view of the forthcoming CEF Program Support Action (PSA) call and the related published concept paper issued by the EU Commission (DG MOVE), dated 15 June 2020 that outlines their preparation of a "Coordination mechanism to federate the National Access Points established under the ITS Directive".<sup>2</sup>

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<sup>1</sup> [https://ec.europa.eu/transport/themes/strategies/news/2019-06-19-vision-zero\\_en](https://ec.europa.eu/transport/themes/strategies/news/2019-06-19-vision-zero_en)

## Introduction

A year ago, the TN-ITS platform<sup>3</sup> updated its strategy, based upon actualized insights, to start developing and deploying activities focused to two important topics: expanding the availability of its services to new member states and expanding into cities. Both topics are related to the concern that there is lack of (changes of) relevant road data, especially beyond the scope of the TEN-T road network.

Today, supported by the EU CEF project TN-ITS GO,<sup>4</sup> authorities in 14 member states are starting to deploy TN-ITS services, taking as a basis their actual digital twin data related to the main road networks and highways. Some of them<sup>5</sup> develop tools<sup>6</sup> for rapid data generation to build and maintain their road databases. Addendum 1 gives a complete visual progress monitor on these deployment activities to date.

In many countries in Europe, data generation for map base layers in city areas is not a responsibility of a central government agency, forming a roadblock to publish accurate data for the whole territory in a consistent way. Some countries recognized this problem and have established central data bases and tools to populate this database by inputs from local authorities. Actually, some of the EU countries who use this approach<sup>7</sup> lead the TN-ITS implementation and the complete digital twin operations.

Member states and cities are confronted with a variety of data publishing protocols, related to various map related services. For base layer map data, member states recognize the CEN based TN-ITS road data update mechanism. For map service layers, DATEXII is mentioned as the data exchange mechanism in the ITS Directive and related delegated acts. A number of other protocols exist addressing other map related service needs, such as public transport etc. An overview of the mobility data eco system is presented in addendum 2.

National Access Points (NAP), established under the ITS Directive through a EU-wide CEF PSA, support the realization of the end-to-end data chains. In some of the TN-ITS deploying countries<sup>8</sup>, the TN-ITS services can already be accessed via the NAP. In other European countries the service is accessible via dedicated links.

No doubt that the NAP enhances the proliferation of the TN-ITS data, as the NAP URL will be likely more commonly known – since it should link to all related mobility data – while links to individual TN-ITS services are probably too dedicated, and could probably lack dedicated dissemination efforts.

TN-ITS services are already in full operation in five leading EU countries.<sup>9</sup> Some of them are carrying out revisions to ensure consistency with the latest specification or are extending the

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<sup>3</sup> <https://www.tn-its.eu>. To know more about TN-ITS: <https://tn-its.eu/news/tn-its/tn-its-what-why-the-webinar-1>

<sup>4</sup> <https://www.tn-its.eu/tn-its-go>

<sup>5</sup> Hungary, Flanders (Belgium), France.

<sup>6</sup> <https://tn-its.eu/news/tn-its/movin-towards-go-for-zero>

<sup>7</sup> Finland, Flanders (Belgium), The Netherlands, UK, Sweden.

<sup>8</sup> An overview is given in Addendum 1.

<sup>9</sup> Finland, Flanders, Sweden, UK and Norway.

feature/attributes their services are supporting. Currently, authorities are developing tools to improve data quality and availability. Nine other countries are in the phase of pilot implementation and trial operations.

TN-ITS is now in a transition period and starts to look to the bigger picture of its role in the complete mobility data space and all aspects of it, such as:

- End user awareness and recognition;
- Addressing short term (such as ISA) and longer term (automation);
- Addressing the market needs of transport and service operators;
- Data aspects (such as trust, quality, integrity, compliance, etc.);
- Co-operations with other platforms;
- International relations with the USA and Japan;
- Operational finance and business issues;
- Governance.

TN-ITS established the related working groups and deliverables to address those items.

There are a few recent initiatives like the publishing of a concept paper ‘Coordination mechanism to federate the National Access Points established under the ITS Directive’ by EC DG Move and from German BAST to establish an EU road authority harmonization group addressing the mechanism to federate the NAPs.

TN-ITS also studied the response from Digital Europe<sup>10</sup> to the ‘Inception Impact Assessment’ by CNECT, title: “Implementing act on a list of High-Value Datasets (HVD)”,<sup>11</sup> as we consider TN-ITS as an embodiment of (parts of) the identified ‘geospace’ and ‘mobility’ datasets as ‘HVD’.

This document reflects on the (TN-ITS) aspects of the data space, and attempts to contribute to the insights generated by the concept paper and the harmonization group. For the ITS community and beyond, it serves as a generic source of information and a possibility for them to give feedback and enhances our knowledge and viewpoints.

## Addressing end-user needs

TN-ITS is a market-driven operation and retrieves the related data and data attributes to be able to finally process them to valid and highly re-usable information for end-user map related base layer services.

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<sup>10</sup> <https://www.digitaleurope.org/resources/digitaleuropes-response-to-the-eu-data-strategy-consultation/>

<sup>11</sup> [https://www.europeandataportal.eu/sites/default/files/analytical\\_report\\_15\\_high\\_value\\_datasets.pdf](https://www.europeandataportal.eu/sites/default/files/analytical_report_15_high_value_datasets.pdf)

This is an important advantage over other (geospatial) data initiatives, e.g. INSPIRE, where shortcomings or improvement areas as “response to user interest and needs” and “the availability of data” were raised during evaluation stages.

As per today, they are the focus points of the TN-ITS platform working group 6.

The TN-ITS GO CEF project develops and deploys methodologies, like the TN-ITS data feedback loop mechanism,<sup>12</sup> to enhance the accuracy of data as expected by end-users, data producers/aggregators who are eager to identify the quality gap/issue along the data chain. End-users of the TN-ITS services do not have an immediate need to retrieve the raw data from the road authority data base, but processed data, suited for the envisioned applications and services.

Specific protocols have been established, used by car brands to be able to communicate to their in-car maps services. TN-ITS has established SLA (Service Level Agreements) with the involved road authorities to assure timely presence and ‘freshness’ to guarantee the feed towards these processors.

NAPs can drive the further enhancing of accuracy, reliability and real time accessibility of the TN-ITS data. NAPs can have a role in the definition and execution of SLA’s supporting TN-ITS objectives for a 24/7/365 quality service.

However, the main TN-ITS issue is not the accessibility of data (the focus of NAP), rather ensuring the availability of data handled by the platform. An investment in automation, co-operation etc. is needed here for tools development and deployment that help accurate and efficient data generation and validation.

Building a complete operational “accessibility infrastructure” to an “empty database” does not immediately make sense.

## **Addressing the end-user awareness and recognition**

The end user e.g. a car driver, looking to its dashboard GNSS application has no immediate awareness of the original sources of data used in this application. Big private actors, even non-EU based, have already established dominant market positions in this data generation and provision. TN-ITS data originates from the public road authorities and need to seek its place in this very competitive market.

As explained in the below chapter on data aspects, TN-ITS data has very competitive advantages in comparison with other supply sources, but the end-user is not aware and cannot yet recognize them. Hence the end-user market-pull for TN-ITS data lacks.

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<sup>12</sup> The feedback loop is in a developing phase, as part of the TN-ITS GO CEF project. Map providers like HERE and TOMTOM receive data feeds from the MS and respond back their observation on the received data quality to the authorities, as lined out in deliverable D 4.1 evaluation plan. The final realization in relation to trust, authority, responsibilities and liabilities of the stakeholders is subject of discussion.

As in any competitive market, an end-user ‘brand’ recognition is necessary to be established for TN-ITS. A potential recognizable TN-ITS brand logo, eventually even appearing on the end-user side, on car dashboard screens or phone app, will help in the visual recognition by the end-user and will help in building up brand ‘trust’ for TN-ITS.

It is recommended that (future) NAPs helps building the user awareness and recognition by co-establishing a strong brand recognition. Along with this intention, probably the market need for a user-oriented data rights management (DRM) and digital contracting system will arise, as services will become more personalized to the (real time) needs of the particular user. TN-ITS can profit from a generic DRM NAP based engine.

## **Addressing short- and longer-term road authority related applications and services**

TN-ITS is an ESSENTIAL building block for addressing acute short term needs (SAFETY-ISA) and longer term needs like future automation. Together with TM 2.0,<sup>13</sup> in harmonization with CCAM and other initiatives, TN-ITS is an essential building block for road authorities to enable, control, and guide the ‘full Automation L3 and above’.

As an emerging European mobility data initiative, it contributes preserving the EU primacy in this technology and business (OEMS, Service providers, Logistic operators etc.).

The deployment of the services via the NAP will strengthen the deployment of services as the recognized public access gate to the relevant data sources, including TN-ITS.

### **TN-ITS and ISA.**

The focus for TN-ITS on short term is ISA, fully in line with the EU vision on SAFETY and the European strategy ‘Vision Zero’.<sup>14</sup>

This topic is extensively addressed in the webinar “How TN-ITS can support ISA: an interactive webinar”, recording available.<sup>15</sup>

TN-ITS is a main tool for road authorities to publish their authoritative ‘trusted’ data to allow applications to inform and ‘impose’ e.g. speed rules towards traffic users (car-drivers); speed being the main cause accidents.

The newly proposed Activity 5.6 in the TN-ITS GO project will address, if approved, the TN-ITS data aspects, by taking ISA as a case study.

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<sup>13</sup> <https://tm20.org/>

<sup>14</sup> [https://ec.europa.eu/transport/themes/strategies/news/2019-06-19-vision-zero\\_en](https://ec.europa.eu/transport/themes/strategies/news/2019-06-19-vision-zero_en)

<sup>15</sup> <https://www.tn-its.eu/news/tn-its-go/how-tn-its-can-support-isa-an-interactive-webinar>

## TN-ITS and automation

The foundations of TN-ITS were laid with the ROSATTE project,<sup>16</sup> and consolidated under the sub-activity 4.7 “Provision of updates of ITS spatial road data” of the EU-EIP platform,<sup>17</sup> as a part of the harmonisation cluster, with a activities on automation (A4.2) and quality of services (A4.1).

Road spatial data plays and will play an extremely important role in automation, as it is the data that allows automatic steering, road access, and adherence to the traffic laws. TN-ITS is the only data source suited for this purpose, due to its authoritative origin. This data source embodies the concept of ‘trust’ by definition and origin.

## Focus to cities

After mainly addressing major roads and highways (Ten-T corridors and beyond), road networks from more regional and city authorities are in the picture for making available their relevant data.

This should be a joint effort of all platforms. For example, if TN-ITS builds a specific registration tool, cities can use it to populate both base-layer/static data (TN-ITS) and service-layer/Dynamic data (DATEXII). Great effort was done in this sense by the UK DFT organization.<sup>18</sup>

One crucial task for the TN-ITS platform is to engage with local authorities, and provide a better understanding of the benefit that TN-ITS services could bring to the city, such as improving their potential to perform digital twin operations based on the generated data. The ERTICO City Moonshot<sup>19</sup> can play a role in this dissemination, and so can the co-operation with big data operators in the ERTICO partnership.

## Addressing the market needs of transport and service operators

Today, service providers use all different types of applications to perform their business. These applications are in search of data, and scan the complete spectrum of data sources.

Each data source has its particular protocol and interface. Data sources can be very local and differ by private supplier and by country.

For private service providers the invoked IT costs of developing, deploying and maintaining the service is a significant part of their operational cost.

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<sup>16</sup> [https://ec.europa.eu/transport/sites/transport/files/themes/its/events/doc/2011\\_03\\_29/2011\\_03\\_29-13-rosatte-framework.pdf](https://ec.europa.eu/transport/sites/transport/files/themes/its/events/doc/2011_03_29/2011_03_29-13-rosatte-framework.pdf)

<sup>17</sup> <https://eip.its-platform.eu/>

<sup>18</sup> <https://www.tn-its.eu/news/tn-its-go/european-tn-its-standard-for-map-updates-unifies-uk-s-digital-infrastructure-data>

<sup>19</sup> <https://erticonetwork.com/ertico-launches-the-city-moonshot-to-engage-inspire-and-empower-cities/>

A European standard access to available data sources of interest would ease the IT operational cost. TN-ITS is based on the CEN TS17267:2018 specification, already harmonised in 14 member states.

NAPs will further support TN-ITS in its goals to fully adhere to the FAIR principles,<sup>20</sup> and the need to establish related Public-Private co-operations and related DRM and SLA's.

## TN-ITS being a high value data set

TN-ITS is an embodiment of (parts of) the identified 'geospace' and 'mobility' data sets as 'HVD' as identified in footnote 11. An overview is given in the next table:

*Table 1: Overview on HVD dataset*

Identified HVD data set	Detailed objects	Relation to TN-ITS data
Geospatial data	GPS data, 3D mapping (building / object mapping).	Subject to TN-ITS
	Maps (national and local maps, cadastres/land registry, land usage, terrain form, postcodes topography, city 3D models)	Subject to TN-ITS
	Real-time data on government infrastructure (roads, railways, mobile communications / Internet), water and electricity supply, construction sites, traffic signage, etc	Not part of TN-ITS
Mobility data	Public transport timetables and real-time updates, usage, reach, intermodality.	Not part of TN-ITS
	Traffic updates (congestion, etc.), construction works, public gatherings and other events/activities affecting transport, including temporary and permanent traffic signage (traffic signs, road markings, lane barriers, lane markings, traffic lights), anonymised vehicle flow (urban planning and organisation) and air traffic management, airport and air traffic control, traffic models.	construction works, traffic signage (traffic signs, road markings, lane barriers, lane markings, traffic lights),
	Personal and commercial mobility, including autonomous vehicles performance (i.e. confidence in collision detection, lane identification etc.) and commercial aviation.	Not part of TN-ITS

<sup>20</sup> [https://en.wikipedia.org/wiki/FAIR\\_data](https://en.wikipedia.org/wiki/FAIR_data)

## **Data -aspects (trust, integrity, compliance, security, quality, etc.)**

From a content perspective, this is the heart of TN-ITS. As the actual state of implementation has focused on the technical IT implementation aspects to ensure the TN-ITS service, TN-ITS will need to address the bigger data space aspects of the complete data value chain and full end-to-end trusted functionality. This will be tackled by the newly defined activity 5.6 in the TN-ITS GO CEF project, if approved.

Data sharing is a 'hot topic', and it is addressed in the European data strategy.<sup>21</sup> The main issue is to assure that from a publisher point of view, the data consumer is using the data for the agreed purpose, and that from a data consumer point of view, the data can be trusted.

A good examples of established data sharing end-to-end systems is the digital television end-to-end publishing and distribution infrastructure. In the digital television market the issue of sharing data was solved by actions like the Digital Millennium Copyright Act,<sup>22</sup> together with the establishment of the related DRM (Digital Rights Management) functionalities, in the late nineties.

### **Data trust**

Trust is the key word. From a user perspective 'trust' embodies all aspects, since it is the complete picture and experience that the user has of the data that provides him trust.

It starts with the recognition of the BRAND. You buy or use a certain product from a brand because you trust its performances.

The technical aspects on trust are very complex. The ultimate trust in sharing (monetary) data is e.g. the trust in the EURO currency, a brand to be technically supported in the banking world, originating from the trust instance of the European Central Bank in Frankfurt. Other examples of strongly 'trusted brands' are VISA, Master Card, etc.

Identified supportive technical elements of trust include but are not limited to:

- Establishment and deployment of the so called 'root of trust' engines. This functionality is not existing or not documented by today's TN-ITS GO partners. Potentially the NAPs can play a role. It is clear that if we want the data to be recognized as authoritative, to be used for imposing legal obligations (e.g. in relation to automation), the trust authority needs to be strong.
- The root of trust supports the availability of data. On the accessibility side of data, the trust is supported by 'maintaining the integrity of data'. Mechanisms like watermarking (digital logo of compliance), encryption, etc. can help here. Recent technologies such as blockchain transaction registration can contribute as well.

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<sup>21</sup> <https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-data-strategy>

<sup>22</sup> <https://www.copyright.gov/dmca/>

- A strong mutual authenticity is one of the building blocks, necessary to support the envisioned data Trust.

## Security

Security aspects are handled from an IT point of view in today's TN-ITS service implementations. A full functional analysis and deployment assessment of all its aspects has not been performed yet.

Security and maintaining mechanisms largely contribute to the trust aspect of data.

In the TN-ITS data sharing chain, there is a need to address the topic on each of the three levels:

- **Data capturing and creation.** What are the security mechanisms used? What are the attack possibilities and counter measures? What are the related procedures (e.g. personnel authorised to deal with the data, etc.)? Today there are no reports on any of such elements by the member states.
- **Data transfer.** How is the data transfer secured? What are the potential attacks?
- **The data base itself.** Potentially, this is the best part of the implemented systems, as probably regular and commonly known IT based security measures have been applied. However, there is no published proof of such assessments.

There is a vast role for the NAPs to strengthen the security aspects of the data chains.

## Data quality

Quality is a topic which is difficult to define. It is probably a 'feeling or observation' by the user if data is qualitative, a lot of aspects play a role and can be personal. The observation that the data is of good quality largely also contributes to the trust that you have in the service.

As an example, a few attributes contributing to data quality applied to the TN-ITS services are summed up below:<sup>23</sup>

- Timeliness (start);
- Reporting period;
- Timeliness (update);
- Latency (content side);
- Location accuracy;
- Classification correctness;
- Error rate;
- Event coverage;
- Report coverage;

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<sup>23</sup> Details can be found in the TN-ITS GO deliverable D4.1.

The EU-EIP forum, in its activity 4.1<sup>24</sup> has described a detailed analysis to address data quality, related to Real Time Traffic Information (RTTI). It also describes methods to maintain the data quality:

1. Continuous monitoring of equipment performance and availability
2. Manual verification of entities, events or conditions
3. Monitoring of data completeness and latency
4. Monitoring of timeliness and data completeness
5. Surveys of perceived quality by users
6. Collection of direct user feedback
7. Monitoring of service use statistics

Being part of the advisory group, ERTICO noticed the quote mentioned in the ongoing study carried out by ERTICO partner VVA<sup>25</sup> related to the revision of a delegated act:

*“RTTI data providers should ensure the level of correctness (data is validated), integrity (data is not compromised), completeness (no gaps in collected data), timeliness (data is associated with an update frequency), accuracy (data accurate enough), reliability (data come from a trusted source), representativeness (data reflects the current situation) and robustness (data can be confidentially processed) of collected, and then shared, data.”*

Since the data availability itself is not the focus of the NAP, it is unclear how the NAP activity will address those quality aspects.

TN-ITS provides innovative mechanism such as the [feedback loop](#) mechanism that greatly improves data quality aspects.

## Compliance

Data compliance is a subject to be addressed by TN-ITS. It is a supportive element to brand image, its logo and the data trust.

NAPs can address the topic of compliance and can play a big role here.

## Documentation

An extensive documentation package is available to support TN-ITS services implementations.

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<sup>24</sup> <https://www.its-platform.eu/filedepot/folder/1077>

<sup>25</sup> <https://www.vva.it/en/>

## Co-operations with other platforms

Following the updated TN-ITS strategy, it was recommended to engage with other platforms. Many contacts and early co-operations have been established with e.g. DATEXII,<sup>26</sup> TM 2.0,<sup>27</sup> OADF<sup>28</sup> and CEN TS 278\_WG7.<sup>29</sup>

Certainly, a number of the discussion elements for TN-ITS, mentioned in this paper, are very valid for DATEXII as well. DATEXII can be seen as the data provider to the so-identified map service layer, indicated as 'dynamic data' in the ITS directive, while TN-ITS is related to so-identified map base layer data, indicated as 'static data' in the directive. So, both are to be considered very complementary. The co-operation also addresses the risk of overlap and non-clarity that might occur to data users.

A specific topic is the potential co-operation with an in-car data sharing methodology platform like SENSORIS.<sup>30</sup> The insight is that in car data can play an important role to further populate the member state databases. TN-ITS researches the potential business models to establish this type of public private co-operations.

Potentially the NAP integration of both TN-ITS and DATEXII gives the opportunity to strengthen these co-operations by providing the bandwidth, people and resources to really do practical work and solve already identified and future issues.

## International horizon

TN-ITS strives to a European wide deployment. However, from a benchmarking perspective, it has established active contacts with other continent's organizations addressing the same topic. Especially focus to Japan and USA.

## Operational Finance and business issues

This document gave insight on the technical aspects and the market-business development aspects. Clearly there is a lot of elements to be addressed before a 'Trusted and recognized brand' is established. The current TN-ITS work carried out is directly related to the CEF TN-ITS GO project, providing financial means to the needed activities and work. The focus of this project is the deployment and enhancement of TN-ITS (pilot) services, not yet addressing the longer term and strategic identified subjects in this document.

The current established TN-ITS WG7 on business plans addresses the topic of after project (ref TN-ITS GO) financing and business planning.

Investment is needed to get market recognition. A market recognized logo radiating trust and quality can be one of the tools. Industry's role in dissemination and marketing is also clear.

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<sup>26</sup> <https://www.datex2.eu>

<sup>27</sup> <http://tm20.org>

<sup>28</sup> <https://www.openautodrive.org>

<sup>29</sup> <https://www.sciencedirect.com/science/article/pii/B9780080424330500277>

<sup>30</sup> <https://sensor-is.org/>

The investment should be a public-private co-operation. So, there is a role for the industry as well. This will guarantee industry involvement that PSA needs to recognize.

We expect that NAPs will need to develop a likely finance and business model, hence a good reason to closely co-operate and form a win-win situation for every involved party, public and private.

## **Governance**

TN-ITS has established a governance structure for the platform, as well as for the CEF implementation project TN-ITS GO. It can contribute to the final architecture of the NAP, how TN-ITS can integrate in this structure.

TN-ITS has the theoretical and practical deployment expertise, and experience on data category and attribute definitions, based upon a vast and defined development procedure that takes into account the involvement of data users. TN-ITS has established and deployed the methodologies for implementation and evaluation of the service.

TN-ITS looks into policy and feasibility for establishing the necessary future compliance requirements and deployment.

ERTICO, as the legal entity embodying TN-ITS is the association of choice to involve all related stakeholders, ensuring the full acceptance and usage of the services

## **Conclusions**

This document presents a reflection on the status of TN-ITS and its identified future directions. Much work lies ahead for us, with focus on final market acceptance, assuring a competitive lead and EU-oriented position.

On the short term implementations such as ISA and on longer term automation are the priority use cases for TN-ITS. These applications will demand vast data space requirements as lined out in this document.

## Addendum 1: The visual progress monitor

This monitor is published 'as is' per date of publishing this paper, and derived from the intermediate TN-ITS GO deliverable 2.2. It will be further updated and improved along the progress of the TN-ITS GO project.

The member states have identified their roadmap to further improve their services. We will update the visual progress monitor on half yearly basis.

		available	not mentioned	not available					
		NL	HU	Cyprus	Portugal	Slovenia	Spain	Greece	
<b>Project status</b>	In planning								
	In development					Q3 2020			
	Demo available					Q4 2020		Jul-20	
	In local testing					Q4 2020			
	Active	Sep-20				Q4 2020		Jul-20	
	In evaluation	Q4 2020						Q4 2020	
<b>Data /network</b>	Highway roads and attributes		33%						A25 only
	Main roads and attributes		33%						
	Local roads and attributes								
	Parking								
	Public transport								
	Speed limits	Highway only							
	Weight restrictions								
	Hight restrictions			future					
	Data enhancements								
	Private roads								
	Private motorway operators	NA							
	Lanes number								
	Road number								
	Road classification								
	transit restrictions								
	road naem								
	road length								
	no entry								
	warning sign								
	stop sign								
	Roadmap (after project)				not concrete	not concrete		not concrete	
<b>Feedback</b>	User feedback service desk								
	Change request procedure								
	Feedback loop implementation								
<b>Safety features</b>	Traffic signs			future					
	Toll barliers						future		
	Gradients (Slope)								
	Transverse gradient (banking)								
	Tunnel Access								
<b>NAP involved</b>									emulator
<b>Update frequency</b>	6 monthly								
	Quarterly								
	monthly	TBD				future			
	Weekly					future			
	daily	TBD	target						
	<daily	TBD							
<b>License</b>	ad hoc				when changes				
				Open					

## Addendum 2 Overview of the mobility data space

The drawing below is generated as a result of an identified co-operation action between TN-ITS and TM2.0. It tries to provide a full overview of the data space, but can miss inputs that were not considered by the contributors, or information that contributors were not aware of at the time of creation (February 2020). This is an open invite to anybody who wants to contribute to improving the overview by simply contacting the author of this document.

