Traveller Information Services
TRAFFIC CONDITION AND TRAVEL TIME INFORMATION SERVICE

Deployment guideline
TIS-DG03-05 | VERSION 01-02-00 | JANUARY 2012
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Service at a glance

**SERVICE DEFINITION**

“Traffic condition and travel time information service” means, both pre-trip and on-trip, the provision of traffic condition (LoS) and travel time information on identified road segments of the TENT-T network and interfaces, thus enabling road users to optimize and better anticipate their journey ahead. This predictive or real-time information should be using different information channels, accessible by the road user via different end-user devices. The service may comprise common as well as individual (personalised, on-demand) information.

**SERVICE OBJECTIVE**

The intention of the service is to make road users react and adapt their driving behaviour to the traffic conditions they are going to meet, by informing them about the current and the expected development of traffic conditions and travel times. The vision is that a user provided with high-quality information will react and adapt his travelling and driving behaviour includes a change of routes, modes or trip schedule (time of departure) as well as changes in the way of driving. Thus the road traffic network is used in a more efficient and safer way with significant contributions to improving environmental performance, energy efficiency and security of road transport.

**SERVICE BENEFIT RADAR**

![Service Benefit Radar Diagram]

**EUROPEAN DIMENSION**

Ideally traffic condition and travel time information should at the European dimension provide continuity across neighbouring regions and between member states. Thus the purpose of this Deployment Guideline is to develop the existing services towards a truly European (pan-European) service and to assure an adequate service quality (Level of service). The European continuity aspects are:

- the service coverage (geographical and time availability),
- the service coverage (geographical and time availability),
- the continuity as regards content across corridors and TEN-T network and interfaces,
- the language-independence characteristics and
- the provision of information about the existence and the price of use of the services and how to access.

Provision of information by means of pictograms or colours on a digital map tends to be language independent, but the pictograms and colours are not uniform at present. Complementary information (spoken
or text) requires translation and provision in different languages.
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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>ANPR</td>
<td>Automatic Number Plate Recognition</td>
</tr>
<tr>
<td>C2C</td>
<td>Car-to-car communication</td>
</tr>
<tr>
<td>C2I</td>
<td>Car-to-infrastructure communication</td>
</tr>
<tr>
<td>CCTV</td>
<td>Closed-circuit Television</td>
</tr>
<tr>
<td>CEN</td>
<td>European Committee for Standardization (Comité Européen de Normalisation)</td>
</tr>
<tr>
<td>CO2</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>DAB</td>
<td>Digital Audio Broadcasting</td>
</tr>
<tr>
<td>DATEXII</td>
<td>DATEX II data exchange v2.0, release from 1.2.2011; specifications for traffic management and information (see prCEN TS 16157 Intelligent transport systems)</td>
</tr>
<tr>
<td>DG</td>
<td>Deployment Guideline</td>
</tr>
<tr>
<td>ESG</td>
<td>Expert and Study Group</td>
</tr>
<tr>
<td>FM</td>
<td>Frequenz Modulation (FM broadcast band)</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technologies</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organisation for Standardization</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Transportation System</td>
</tr>
<tr>
<td>LoS</td>
<td>Levels of Service</td>
</tr>
<tr>
<td>MOBINET</td>
<td>Mobilität in Ballungsräumen (Mobility in Conurbations - German research project in the area of Munich)</td>
</tr>
<tr>
<td>PND</td>
<td>Personal Navigation Device</td>
</tr>
<tr>
<td>simTD</td>
<td>Safe and Intelligent Mobility Test Field Germany (German research project)</td>
</tr>
<tr>
<td>TEN-T</td>
<td>Trans European Transport Network</td>
</tr>
<tr>
<td>TERN</td>
<td>Trans European Road Network</td>
</tr>
<tr>
<td>TPEG</td>
<td>Transport Protocol Experts Group (TPEG-1 (18234 series); TPEG-2 (21219-series))</td>
</tr>
<tr>
<td>TIS</td>
<td>Traveller Information Services</td>
</tr>
<tr>
<td>TV</td>
<td>Television</td>
</tr>
<tr>
<td>VMS</td>
<td>Variable Message Signs</td>
</tr>
<tr>
<td>WAP</td>
<td>Wireless Application Protocol</td>
</tr>
<tr>
<td>WDR</td>
<td>Westdeutscher Rundfunk (West German Broadcasting)</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>ITT</td>
<td>Instantaneous Travel Time</td>
</tr>
<tr>
<td>ORTT</td>
<td>Output Rebuilt Travel Time</td>
</tr>
<tr>
<td>ETT</td>
<td>Estimated Travel Time</td>
</tr>
<tr>
<td>MTT</td>
<td>Mixed Travel Time</td>
</tr>
<tr>
<td>FTT</td>
<td>Forecast Travel Time</td>
</tr>
<tr>
<td>RFC</td>
<td>Request For Comment</td>
</tr>
<tr>
<td>FR&lt;#&gt;</td>
<td>Functional requirement &lt;number&gt;</td>
</tr>
<tr>
<td>FA&lt;#&gt;</td>
<td>Functional advice &lt;number&gt;</td>
</tr>
<tr>
<td>OR&lt;#&gt;</td>
<td>Organisational requirement &lt;number&gt;</td>
</tr>
<tr>
<td>OA&lt;#&gt;</td>
<td>Organisational advice &lt;number&gt;</td>
</tr>
<tr>
<td>TR&lt;#&gt;</td>
<td>Technical requirement &lt;number&gt;</td>
</tr>
<tr>
<td>TA&lt;#&gt;</td>
<td>Technical advice &lt;number&gt;</td>
</tr>
<tr>
<td>CL&amp;FR&lt;#&gt;</td>
<td>Look and feel requirement &lt;number&gt;</td>
</tr>
<tr>
<td>CL&amp;FA&lt;#&gt;</td>
<td>Look and feel advice &lt;number&gt;</td>
</tr>
</tbody>
</table>
1 Introduction

1.1 The concept of the EasyWay Deployment Guidelines

1.1.1 Preliminary note (new headline to be conform to headline-systematic)

This document is one in a set of documents created as part of the EasyWay project, a project for Europe-wide ITS deployment on main TERN corridors driven by national road authorities and operators with associated partners including the automotive industry, telecom operators and public transport stakeholders. It sets clear targets, identifies the set of necessary ITS European services to deploy (Traveller Information, Traffic Management and Freight and Logistic Services) and is an efficient platform that allows the European mobility stakeholders to achieve a coordinated and combined deployment of these pan-European services.

EasyWay has started in 2007 and has established a huge body of knowledge and consensus for harmonised deployment of these ITS services. This knowledge has been captured in documents providing guidance on service deployment, the EasyWay Deployment Guidelines.

The Deployment Guidelines had started with their first iteration mainly capturing best practice. This supported service deployment in EasyWay very strongly by

- making EasyWay actors in deployment cognisant of the experiences made in other parts of Europe
- helping to avoid making errors others has already made
- speeding up deployment by highlighting important and critical issues to look at

Meanwhile, this best practice has successfully contributed to ITS deployments all over Europe, so it is possible now to take the logical next step and start actually recommending those elements of service deployment that have proven their contribution to both, the success of the local deployment as well as the European added value of harmonised deployment for seamless and interoperable services.

1.1.2 Applying Deployment Guidelines – the “comply or explain” principle

The step from descriptive best practice towards clear recommendations is reflected in the document structure used for this generation of the Deployment Guidelines. Besides this introduction and the annexes that cover specific additional material, the Deployment Guidelines consist of two main sections:

Part A – this part covers the recommendations and requirements that have proven to contribute to successful deployment and have been agreed by the EasyWay partners as elements that should be part of all deployments of this particular service in the scope of EasyWay. Thus, the content of this section is prescriptive by nature and EasyWay partners are expected to ensure that their deployments are compliant to the specifications in this section. Wherever concrete circumstances in a project do not allow fully following these recommendations, EasyWay partners are expected to provide a substantial explanation for the necessity for this deviation. This concept is known as the “comply or explain” principle.

Part B – this part offers an opportunity to provide more valuable but less prescriptive information. Such supplementary information may contained – but is not limited to – regional/national examples of deployment and business model aspects like stakeholder involvement or cost/benefit analysis results.

1.1.3 Use of Language in Part A

It is a mandatory requirement for every prescriptive document to provide specifications in a well-defined and unambiguous language. There are various specifications in the world of specifications that clarify the use of particular words in such prescriptive texts.

For the purpose of the EasyWay Deployment Guidelines, the well-established provisions of the RFC 2119 (http://www.ietf.org/rfc/rfc2119.txt, see (1)) are used, which is used to specify the basic Internet standards:
The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119.

An overview over the keywords, their meaning and the possible answers in the context of part A gives the following table. In general the keywords in brackets are possible, but not recommended to use, to avoid confusion, which could be originated as a consequence of different common linguistic usage of the terms in the different EU member states.

<table>
<thead>
<tr>
<th>Requirement wording</th>
<th>Meaning in RFC 2119</th>
<th>Meaning in EasyWay</th>
<th>Possible checklist answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUST (REQUIRED, SHALL)</td>
<td>the definition is an absolute requirement</td>
<td>there may exist insurmountable reasons to not fulfill (e.g. legal regulations…)</td>
<td>fulfilled: yes or fulfilled: no - explanation of insurmountable reasons</td>
</tr>
<tr>
<td>MUST NOT (SHALL NOT)</td>
<td>the definition is an absolute prohibition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHOULD (RECOMMENDED)</td>
<td>there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.</td>
<td>The Definition is very close to a &quot;MUST&quot;, &quot;MUST NOT&quot; Meaning in EasyWay conform to RFC 2119</td>
<td>fulfilled: yes or fulfilled: no - with explanation</td>
</tr>
<tr>
<td>SHOULD NOT (NOT RECOMMENDED)</td>
<td>there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAY (OPTIONAL)</td>
<td>The item is truly optional. One deployment may choose to include the item because of particular local circumstances or because it is felt to deliver a special added value</td>
<td>Meaning in EasyWay conform to RFC 2119</td>
<td>fulfilled: yes - with explanation or fulfilled: no</td>
</tr>
</tbody>
</table>

Table 1: Part A - requirement wording

Note: the capitalisation of these keywords that is frequently used in Internet standards is not recommended for EasyWay Deployment Guidelines. The use of this 'requirements language' allows the direct transfer of the requirements stated in part A to a compliance checklist.

The following paragraph gives an example for a functional requirement:

**FR2:** Data and information collected by both automatically and non-technical sources **must** be based upon both a consistent geographic reference model and a time validity model, which both **must** be part of data description. The geographical basis **may** be left to the operator to define.

Beneath “Requirement” a new semantic element “Advice” is proposed for part A, which has not the character of a hard requirement but of a “recommendation” and hence must not be listed in the compliance checklist. “Advises” are not immediately related to the three pillars of ITS-service harmonization (Interoperability, Common look & feel, Quality criteria) but to “inner features” of an ITS-service. Nevertheless such an element delivers a European added value and hence should be addressed by the deployment guidelines.

The notation for using the advice element in the text is as follows:

Advice

**FA1:** Loremipsumdolor sit amet, consetetursadipscingelitr, ...
1.2 ITS-SERVICE PROFILE

1.2.1 ITS-SERVICE STRATEGY

1.2.1.1 General Service Description

A general overarching description of TIS-services is outlined in the "Traveller Information Services REFERENCE DOCUMENT, TIS Deployment Guideline Annex, Version 01-02-00"

- Executive summary and
- Chapter 2.1 "General Service Description"

Specifically "Traffic Condition and Travel Time Information Service" means the provision of information about traffic conditions (LoS - Level of traffic service) and travel times on identified road segments of the TENT-T network and interfaces. This predictive or real-time information could be provided on-trip and pre-trip using different information channels, accessible by the road user via different end-user devices.

The service is directed to the road user and may comprise common as well as individual (personalised, on-demand) information.

Relevant information for this service is:

- status of the current traffic conditions (LoS - Level of traffic service) and travel times
- current changes in and forecast of traffic conditions and travel times

1.2.1.2 What is the Vision?

The intention of the service is to make road users react and adapt their driving behaviour to the traffic conditions they are going to meet, by informing them about the current and the expected development of traffic conditions and travel times. The vision is that a user provided with high quality information will react and adapt his travelling and driving behaviour including a change of routes, modes or trip schedule (time of departure) as well as changes in the way of driving. Thus the road traffic network is used in a more efficient and safer way with significant contributions to improving environmental performance, energy efficiency, security of road transport.

1.2.1.3 What are the Missions?

The main service missions are:

- Inform the road user about the current traffic conditions and travel times in order to support him finding the best way to travel and evaluating accurately the trip schedule,
- Provide the road user with forecast (long, middle and short-term) about the probable road traffic conditions and travel times for a specific road network or network element at a point in time to be selected by the road user,
- Inform the road user on traffic conditions and travel times such that he can travel in a calmer and safer way.

Problems to consider

- Difficulty for the road user to easily access to information (in relation with the Commission requirement for a universal minimal set of information)
- Incompleteness of information
- Untimeliness of information
- Inconsistency in the presentation of information to the road user, across different information channels and portals (diverging interpretation of the information by the road user). To offer high-quality individual

---

1 Not to mix up with Level of ITS-service
(personalised, on-demand) information, the co-operation with public bodies and private commercial partners/service providers is crucial.

- Inconsistency of the information provided in accordance with any traffic management plans (TMP, see TMS-DG07) which are in operation of the road authorities or traffic management centres

1.2.1.4 EasyWay harmonization focus

A main focus of this EasyWay-deployment guideline is the Internet-based pre-trip and on-trip traffic information on dynamic maps, with road sections coloured according to defined categories of Level of Service and additional information about travel times. This type of display is already used by many information providers but sometimes with slight differences.

A second main focus lies on providing such information on-trip on Variable Message Signs (VMS), which are operated along the route by road operators.

Another focus lies on the interfacing between road operators and national, regional or local broadcasters, which provide traffic forecasts to mass audiences. Through the rapid evolution of mobile phone technology based end user devices the provision of individual (personalised, on-demand) information services is increasing.

1.2.1.5 Distinction to other ITS-services

Relevant information for this service is:

- state of the current traffic conditions (LoS - Level of traffic service) and travel times
- current changes in and forecast of traffic conditions and travel times

The information provision should be in accordance with any management plans (TMP, see TMS-DG07) which are in operation of the road authorities or traffic management centres. Relevant complementary information, which is not content of this Deployment Guideline and will be covered by other DG, is:

- causes and durations of traffic disturbances, e.g. incidents, accidents (see TMS-DG05), weather (see TIS-DG06) or events such as construction sites (see TIS-DG02)
- recommendation of alternatives (e.g. re-routing or modal shift, see TMS-DG07)
- long or middle term forecast of traffic conditions and travel times based on historical data (not covered by EasyWay deployment guidelines)
1.2.2 Contribution to EasyWay Objectives

1.2.2.1 Service radar

A general overarching description of TIS-services is outlined in the "Traveller Information Services REFERENCE DOCUMENT, TIS Deployment Guideline Annex, Version 01-02-00", Chapter 2.2 "Contribution to EasyWay Objectives".

The graph below provides a quantification of the “Traffic Condition and Travel Time Information Service” services added value regarding the three main objectives of EasyWay which are: safety, efficiency and environment. The applied scales for the service radars are based on an expert view and not on specific scientific analysis.

![Traffic condition and travel time information service radar](image)

Figure 1: Traffic condition and travel time information service radar

1.2.2.2 Safety

Information about traffic conditions and travel times has an impact on road safety. On a network with no possible rerouting, the safety efficiency is strongly linked with the ability of the system to display dynamic and located information. Due to the provision of predictive and real-time information to the road users, they can react to find the best way to travel and to bypass critical road segments / areas of the network, respectively. Eventually, less stressed and better informed users lead to a reduction of accidents and injuries on the road.

1.2.2.3 Environmental impact

Predictive and real-time information about the traffic condition and travel times contribute strongly to the improvement of traffic efficiency, because it supports road users to select more cost- and time-effective trips. The information can be used for recommendations so that the traffic load can be diverted inside the road network or shift to public transport in case such alternatives do exist. The network efficiency is effective when collateral rerouting is under the road operator control (e.g. rerouting is taken into account in a traffic management plan), but can be decreased in case of uncontrolled rerouting, which can for example lead to severe congestion on local networks.

1.2.2.4 Network efficiency

The provision of information can help to reduce frequency and length of congestions, to harmonise traffic flow and to reduce disturbances in the whole road network. More efficient trips, shorter in time or with other transportation modes, this helps to reduce negative effects of traffic on the environment, e.g. to decrease the CO2 emission.
1.2.3 State of the art

1.2.3.1 Overview

The following diagram gives a schematic overview of the functional architecture of traffic condition and travel time information services.

![Diagram of traffic condition and travel time information services]

1.2.3.2 Data collection

Data collection is carried out based on different available sensor types and collection methodologies delivering the following data types:

- Traffic volume and speed, occupation rate (e.g. collected by loops, radar, ...)
- Trajectories (e.g. collected by ANPR - automatic number plate recognition, ...)
- Floating car data (e.g. collected by Taxi FCD, Navigation Systems, Phone Data, ...)
- Event-based information (provided by police, road authorities)
- Historical data

All provided data must be based on as well a consistent geographic reference model as a time stamp model, which must be part of data description.

1.2.3.3 Data fusion and processing

Traffic condition (LoS) Information

Merging and aggregating data from different sources (data-fusion) is the basis of LoS calculation. Within Europe different methodologies and traffic models exist to aggregate the real-time and predictive traffic condition and travel time information.

The result is the so called Level of Service, which consists of four traffic states, which are depicted in a map by colouring route segments or links.
Travel time Information

Travel time is information easy to understand but it becomes more complex at the time to calculate it. Indeed, various algorithms are commonly used linked to the following distinct travel times:

- **Instantaneous Travel Time (ITT)**
  Real time processed on every network section, based on the raw data measured by counting stations. This travel time consists in the sum of each elementary section ITT. Input raw data: Flow rate, Occupation rate, speed.

- **Output Rebuilt Travel Time (ORTT)**
  Retroactively processed, based on the raw data measured by counting stations. Input raw data: Flow rate, Occupation rate, speed. The result is evaluated using a fictitious vehicle and historical speeds.

- **Estimated Travel Time (ETT)**
  Retroactively calculated, using for examples measures from tolls transactions. Travel times of outbound vehicles are filtered to get reliable results.

- **Mixed Travel Time (MTT)**
  This is a combination of the ORTT and the ETT, using the principle of data fusion. Data fusion can be based on a linear relation or a strategy more complex.

- **Forecast Travel Time (FTT)**
  Based on the reproducibility of the road traffic, the FTT is built through prediction models, applied to historical measures databases. Input raw data: Flow rate, Occupation rate, Speed.

1.2.3.4 Service provision

There are various European services in operation which can be distinguished according to the information providers, i.e.:

- Public road authorities, acting as road operators
- Private road operators
- Broadcasters
- Other private service providers

The named service providers can be differentiated between those who give collective information and those who offer individual (personalised, on-demand) information. Part of the collective channels as e.g. road side information panels (VMS) exclusively in the responsibility of road operators, internet based traffic information services can be provided by private service providers, too.

1.2.3.5 Information channels

Different information channels could be used for the provision of the service to the road user:

- roadside information infrastructure of road operators (own VMS, VMS of other road operators)
- internet
- broadcasting facilities used by media
  - analog/digital: FM/DAB/DAB+ (radio), DVB-T/S/C (TV)
  - data communication: RDS-TMC (FM), TPEG (DAB, DBM)
- mobile radio (2G (GPRS), 3G (UMTS), 4G (LTE)): TPEG
- I2V (infrastructure to vehicle facilities): e.g. citizen band radio, FM radio – in future cooperative systems
### 1.2.3.6 End-user devices

End user access to traffic condition and travel time information is possible by different end-user devices.

- Roadside information panels (e.g. VMS)
- End user devices with internet access (stationary devices as PCs, TVs and other stationary internet-connected devices, tablets, mobile phones, smart phones, ...)
- End user devices without internet access for static information provision (the same as above)
- Navigation systems
  - by mobile radio connected PNDs (e.g. TPEG or proprietary interfaces)
  - RDS-TMC / TPEG (broadcast)
- Television (videotext, dedicated channels, Internet-based)
- Radio (spoken, text to speech)
- Radio (data, text)

In-car systems (end user terminals) offer the advantage that they can take into account vehicle-type based speed limits or other vehicle-type based restrictions (see EasyWay deployment guideline TIS-DG04: Speed limit information service).

The table below shows the different end-user devices with the reference to some attributes.

<table>
<thead>
<tr>
<th>Pre-trip use</th>
<th>Roadside information panels (VMS)</th>
<th>Internet based Devices</th>
<th>Navigation Systems</th>
<th>RDS-TMC / TPEG based devices</th>
<th>Radio (spoken)</th>
<th>Television</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>y</td>
<td>y</td>
<td>n</td>
<td>n (y)</td>
<td>y</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>On-trip use</th>
<th>Roadside information panels (VMS)</th>
<th>Internet based Devices</th>
<th>Navigation Systems</th>
<th>RDS-TMC / TPEG based devices</th>
<th>Radio (spoken)</th>
<th>Television</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>y (n)</td>
<td>y</td>
<td>n</td>
<td>n (y)</td>
<td>y</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language independent</th>
<th>Roadside information panels (VMS)</th>
<th>Internet based Devices</th>
<th>Navigation Systems</th>
<th>RDS-TMC / TPEG based devices</th>
<th>Radio (spoken)</th>
<th>Television</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (y)</td>
<td>n</td>
<td>n</td>
<td>y</td>
<td>y</td>
<td>n</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information provision by road operators</th>
<th>Roadside information panels (VMS)</th>
<th>Internet based Devices</th>
<th>Navigation Systems</th>
<th>RDS-TMC / TPEG based devices</th>
<th>Radio (spoken)</th>
<th>Television</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>y</td>
<td>y</td>
<td>y</td>
<td>n</td>
<td>n (y)</td>
<td>n</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information provision by other parties</th>
<th>Roadside information panels (VMS)</th>
<th>Internet based Devices</th>
<th>Navigation Systems</th>
<th>RDS-TMC / TPEG based devices</th>
<th>Radio (spoken)</th>
<th>Television</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>y</td>
<td>y</td>
<td>y</td>
<td>y</td>
<td>y</td>
</tr>
</tbody>
</table>

**Table 2: Characteristics of the different end-user devices**

### 1.2.4 European Dimension

Ideally traffic condition and travel time information should at the European dimension provide continuity across neighbouring regions and between member states. Thus the purpose of this Deployment Guideline is to develop the existing services towards a truly European (pan-European) service and to assure an adequate service quality (Level of service). The European continuity aspects are:

- the service coverage (geographical and time availability),
- the continuity as regards content across corridors and TEN-T network and interfaces,
- the language-independence characteristics and
- the provision of information about the existence and the price of use of the services and how to access.

Provision of information by means of pictograms or colours on a digital map tends to be language independent, but the pictograms and colours are not uniform at present. Complementary information (spoken or text) requires translation and provision in different languages.
2 Part A: Harmonization Requirements

2.1 Service Definition

“Traffic condition and travel time information service” means, both pre-trip and on-trip, the provision of traffic condition (LoS) and travel time information on identified road segments of the TENT-T network and interfaces, thus enabling road users to optimize and better anticipate their journey ahead. This predictive or real-time information should be using different information channels, accessible by the road user via different end-user devices. The service may comprise common as well as individual (personalised, on-demand) information.

2.2 Functional Requirements

2.2.1 Functional architecture

The following figure shows the typical functional architecture of a “Traffic condition and travel time information service”. The vertical lines show, where it is appropriate to segment the whole functionality of the service into at most three sub-functions.

![Functional architecture of the service and decomposition in three sub-functions](image)

Functional requirement:

- **FR1**: Functional decomposition into sub-functions with the provision of interfaces must be carried out to enable interoperability in those cases that the service is provided by more than one organisation (and should be carried out in any case to be prepared for an easy functional decomposition as may be the case in the future)

2.2.2 Functional decomposition \(^2\) and interfaces

2.2.2.1 Sub-function 1 “Data collection”

Tools and methodologies for traffic data collection are not covered by this deployment guideline. They depend amongst others on the particular used data collection system and are left to the operator to select.

Functional requirements:

- **FR2**: All provided data must be based on as well a consistent geographic reference model as a time stamp model, which must be part of data description.
- **FR3**: The geographical basis may be left to the operator to define.
- **FR3**: Beneath real time data also historic data may be used to generate traffic condition and real time predictions.

\(^2\)The ITS service is “distributed” over more than one administration (cross-border, cross-regional) for operation, i.e. different road operators and other parties are involved, providing “logical sub-functions”. Between the distributed functions interoperability must be guaranteed by properly specified interfaces.
2.2.2.2 Sub-function 2 “Data fusion and processing”

Within Europe different methodologies exist to aggregate the real-time and predictive traffic condition and travel time information. These methodologies are not covered by the present guideline and are left to the operator to select. They depend amongst others on the particular used data fusion and processing system and particularly traffic model applied.

Functional requirement:

- **FR4**: Source, scope and quality of data provided by content owners to content providers must be defined by the partners and must be part of data interface description.

2.2.2.3 Sub-function 3 “Information provision”

Information provision is carried out by different service providers in accordance of specific business models. The information provision to the road user on end-user devices has to be done using various information channels (see 1.2.3.5 “Information channels”).

Functional requirements:

- **FR5**: When providing a customer oriented traffic condition and travel time information service the users benefit can be distinguished between:
  - public available traffic information (paid by public bodies) and
  - private traffic information (added value with special user payment),

  which should be clearly distinguished in case of private organisations involved in the value chain (see also business model).

- **FR6**: The area of information dissemination should be defined in relation to the media used (particularly concerning the broadcast services which are location-dependent)

2.2.2.4 Interface requirements

**Note**: If the ITS service is “distributed” over more than one administration (cross-border, cross-regional) for operation, i.e. different road operators and other parties are involved, providing “logical sub-functions”, interoperability between the distributed functions must be guaranteed by properly specified interfaces.

**Interface requirement interface 1** (see also Technical requirements, DATEXII-profiles):

- **FR7**: To enable interoperability between all involved parties the sub-functions data collection and data fusion and processing must - depending on the used data type for the data fusion and processing - require/provide an interface 1 with one or several of the following information structures:
  - traffic volume and speed, occupation rate (e. g. collected by loops, radar, ...)
  - trajectories (e. g. collected by APNR - automatic number plate recognition, ...)
  - floating car data (e. g. collected by Taxi FCD, Navigation Systems, Phone Data, ...)
  - Event-based information (provided by police, road authorities, ...)
  - Historic data

**Interface requirement interface 2** (see also Technical requirements, DATEXII-profiles):

- **FR8**: To enable interoperability between all involved parties the sub-functions data fusion and processing and service provision must require/provide an interface with the following traffic condition and information structure
  - Level of Service
  - traffic states (actual situation and forecasted for 30’, 1 hour and seven days)
  - Travel times

**Interface Advice interface 2**:

- **FA1**: In order to provide efficient and adapted information when needed and also to prevent from disseminating counterproductive information additionally event-based information and official traffic
management plans should be provided, which are covered by other EasyWay deployment guidelines (See TIS-DG02 "Forecast and Real Time Event Information" and TMS-DG07 "Traffic management plan for corridors and networks")

2.3 Organisational Requirements

Organisational Architecture/Business Model

A general overarching description of the key actors, their roles in the value chain and the related conditions for TIS-service provision is outlined in the "Traveller Information Services REFERENCE DOCUMENT, TIS Deployment Guideline Annex, Version 01-02-00":

- Chapter 3.1 "Introduction to key actors in the traveller information chain" and
- Chapter 3.2 "Conditions for Service Provision - Business Model"

The following picture shows the historical grown organisational architecture of the traffic condition and travel time service:

- Chapter 3.1 "Introduction to key actors in the traveller information chain"
- Chapter 3.2 "Conditions for Service Provision - Business Model"

Currently the historical role distribution is dramatically changing. Various possible combinations of cooperation between road operators and others parties show the following figures:

- Case A
- Case B
- Case C

Figure 4: traffic condition and travel time information service – organisational architecture (historical)

Figure 5: Organisational architecture – road operator point of view
Figure 6: Organisational architecture – others (not road operator) point of view

Note: Though due to the fact, that the partners are public or private road organisations as well as public or private service providers, who are legally autonomous in varying degrees and in the international context sometimes even work on different national laws, it is not required to define organisational aspects on a legal and binding basis.

Organisational Advice:

OA1: Clear definitions of organisational aspects are a crucial precondition for the successful implementation of a "Forecast and real-time event information service" and should be documented and signed of all involved parties/partners in form of a Common partner arrangement/MoU - Memorandum of understanding, which fixes the co-operation.

The documents should define the modes of co-operation and must contain operation instructions. Thus they should be thoroughly verified before signature. Both documents are a declaration of intent to fulfil them but have no legal binding. The appointment should be concluded in written form, on the one hand, because it requires a clear common understanding of the co-operation, on the other hand because the signing of the contract can be seen as a milestone with appropriate media savvy.

A new challenge is the permanent increasing number of public-private partnerships in the TIS-services. Here, where private stakeholders execute sovereign tasks or receive data, binding contracts should be developed and closed. Another current aspect is the use of private generated data for TIS-services. A contract (with service level agreement) should be a MUST wherever the service relies on receiving privately generated data.

Organisational requirement:

• OR1: The organisational and operational structure of the service as well as the role of each organisation/body and its exact tasks in the chain must be defined
• OR2: All for successful implementation of a ”Traffic condition and travel time information service” necessary organisational aspects must be documented and signed of all involved parties/partners in form of a Common partner arrangement/MoU - Memorandum of understanding, which fixes the co-operation.
• OR3: In case of involving private partners delivering private generated data for "Traffic condition and travel time information service" a contract (with service level agreement) be must developed and closed
wherever a "Traffic condition and travel time information service" relies on receiving privately generated data.

- **OR4**: All for successful implementation of a "Traffic condition and travel time information service" necessary collaboration processes/workflows and interfaces must be described.
- **OR5**: The information provision must be in accordance with any management plans (TMP, see TMS-DG07) which are in operation of the road authorities or traffic management centres.
- **OR6**: In cases roles are taken by two or more organisations the following organisational requirements should be respected for two service life cycle phases:
  - ITS-service elaboration
  - ITS-Service operation and quality management (concerning content provider and service operator)

### 2.4 Technical Requirements

#### 2.4.1 Required ICT Infrastructure

No specific requirements or advices.

#### 2.4.2 Standards and Agreements: Existing and Required

##### 2.4.2.1 DATEXII-Profiles

Interoperable interfaces between systems are essential for many EasyWay objectives like continuity of services and cross-border traffic management cooperation. Hence, EasyWay has itself decided to actively contribute to the establishment of the required standardisation efforts by launching its dedicated working group ESG5 and liaising with the relevant European standardisation body, namely with CEN TC278 WG8 (“Road Traffic Data”). The result of this cooperation is the “DATEX II” specification for interoperable machine-to-machine communication of ITS services, available as European Standard CEN/TS 16157. This specification is used throughout EasyWay for interoperable access to dynamic traffic and travel data.
Technical requirement:

- **TR1**: To enable interoperability between different organisations involved in the traffic condition and travel time service value chain the corresponding DATEXII-Profiles must be used for interface 1:

  o **Static information**: Measurement site information

  o **Dynamic information**: Traffic flow

3 DATEXII profiles consist of a set of data elements taken from the overall DATEX model and can include a subset (Schema) of relationships between those elements.
- Dynamic information: Traffic speed (average)
Dynamic information: Traffic speed (single vehicle)

Dynamic information: Occupancy rate
Dynamic information: Trajectories (proposal to use itinerary → vehicle speed per itinerary)
- Dynamic information: Floating car data (proposal)

One single point; here: position of vehicle; can be specified in various ways, for instance by coordinates
• **TR2**: To enable interoperability between different organisations involved in the traffic condition and travel time information service value chain the corresponding DATEXII-Profiles **must** be used for interface 2:

  o Dynamic information: Level of Service (LoS)

```
class LoS

PayloadPublication
  ElaboratedDataPublication
    + forecastDefault: Boolean [0..1]
    + periodDefault: Seconds [0..1]
    + timeDefault: DateTime [0..1]

ElaboratedData
  + forecast: Boolean [0..1]

BasicData
  + measurementOrCalculatedTimePrecision: TimePrecisionEnum [0..1]
  + measurementOrCalculationPeriod: Seconds [0..1]
  + measurementOrCalculationTime: DateTime [0..1]

TrafficStatus
  + trafficStatus: TrafficStatusEnum

TrafficStatusValue
  + trafficStatusValue: TrafficStatusEnum

Possible traffic status values:
- Impossible
- Congested
- Heavy
- FreeFlow
- Unknown
```
Dynamic information: Travel times

TR3: To enable interoperability between different organisations involved in the traffic condition and travel time information service the mapping of traffic conditions and travel times to the relevant information provision standards TPEG, ALERT-C should be considered.

2.4.2.2 Need for Additional Specifications

None
2.5 Common Look & Feel

Common look & feel advice:

- **CL&FA1**: Information for the end user should always be self-consistent whatever media or end user device is used.

Specifically according to traffic condition information

Common Look & feel requirements

- **CL&FR1**: The display of signs/pictograms on VMS or other end-user devices should be conforming to the Vienna Convention for use on VMS, Annex IX and Annex 10 of ECE/TRANS/WP.1/119/Rev.2 27 May 2010 (see http://www.unece.org/index.php?id=17582) and in line with the requirements of the EasyWay Variable Message Signs Harmonisation Guidelines Part I and Part II.

- **CL&FR2**: To enable intuitive perception of information by the user, service providers must use several colours for traffic state representations on digital maps, chosen on a commonly shared intuitive order. The following colours must be used:
  - White, grey, blue... (depending on the display background) – no information available
  - green - free traffic (free flow)
  - yellow/amber/orange - heavy traffic
  - red - congested traffic
  - black - stationary traffic (impossible)

Specifically according to travel time information

Common Look & feel requirements

- **CL&FR3**: The display of travel times and delay times on VMS or other end-user devices (websites, navigation systems) should respect the following format: <XX> min (+ YY)

- **CL&FR4**: It should always be indicated for which location (intersection, exit, city ...) the travel time displayed is valid.

Common Look & feel advices

- **CL&FA2**: Every VMS other end-user devices providing information about abnormal travel time should also inform as well on the traffic situation.
2.6 Level of Service Definition

2.6.1 Preliminary remark

The scope of EasyWay is to provide Core European Services to the European road users. These services are harmonized in content and functionality, but also in their availability: The road users shall be able to expect a certain services offer in a specific road environment. In order to provide a basis for the harmonization process EasyWay needs a tool to define such environments in an agreed manner. This tool is the Operating Environments – a set of pre-defined road environments combining physical layout of the road and network typology with traffic characteristics.

In essence, EasyWay has agreed on a set of 18 pre-defined Operating Environments (OE) where each OE is a combination of three criteria:

- Physical characteristics – Motorways, other 3/4 lane roads or 2-lane roads
- Network typology – Corridor, Network, Link or Critical spot
- Traffic characteristics – Traffic flow and road safety situations (with optional additions)


2.6.2 Level of Service Criteria

The Levels of Service (LoS) definition of Traffic condition and travel time Information Services follows the general Levels of Service definition (core criteria) outlined in the "Traveller Information Services REFERENCE DOCUMENT, TIS Deployment Guideline Annex, Version 01-02-00" chapter 5.1 "Levels of service and quality"

<table>
<thead>
<tr>
<th>Core Criteria</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>User interface</strong></td>
<td>One fixed language (all official languages)</td>
<td>Information available is capable of being provided in a common and shared language (English).</td>
<td>Information available is capable of being provided independent of language</td>
</tr>
<tr>
<td><strong>Neighbouring Provision</strong></td>
<td>No information exchange</td>
<td>Information exchange to neighbouring only</td>
<td>Neighbouring and beyond information provider exchange</td>
</tr>
<tr>
<td><strong>Local and secondary Network Information</strong></td>
<td>None (information on TEN-T road network)</td>
<td>Exchange and use of information for strategic non TEN-T road network (key roads)</td>
<td>If necessary, additional information on local routes with impact on the TEN-T road network</td>
</tr>
<tr>
<td><strong>Level of Detail (Location Reference)</strong></td>
<td>None</td>
<td>Route specific segments (between 2 junctions)</td>
<td>Road segment specific (approx.. 1 km)</td>
</tr>
<tr>
<td><strong>Static / Dynamic</strong></td>
<td>Static/historical only</td>
<td>Static/historical and partly dynamic</td>
<td>Static/historical and fully dynamic</td>
</tr>
</tbody>
</table>

Legend:
*User interface concerns only Traffic condition information. This is not relevant for Travel Times, which are provided on a language independent way (digits for hours and minutes).

Table 3: Level of Service

The “Levels of quality table” reflects the requirements of the data quality which are needed for the Traffic Condition and Travel Time Information Services. This table is not end-user oriented as the Table 3: Level of Service. The definitions of the below-mentioned table are according to the ISO/PDTR 21707 standard.
### Levels of Quality Table: Traffic Condition and Travel Time Information Services

<table>
<thead>
<tr>
<th>Criteria</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accessibility</strong></td>
<td>Only on hotspots</td>
<td>On main routes where problems often occur</td>
<td>On all routes</td>
<td></td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Not guaranteed</td>
<td>Guaranteed to a minimum level</td>
<td>Guaranteed to a medium level</td>
<td>Guaranteed all the time</td>
</tr>
<tr>
<td><strong>Timeliness</strong></td>
<td>Not guaranteed</td>
<td>30 min – 15 min</td>
<td>15 min – 1 min</td>
<td>around 10 s</td>
</tr>
<tr>
<td><strong>Update frequency</strong></td>
<td>Only on an irregular basis</td>
<td>On a regular basis</td>
<td>As frequent as currently possible respectively as a significant change of traffic conditions occurs”</td>
<td></td>
</tr>
<tr>
<td><strong>Quality Assurance</strong></td>
<td>No regulation</td>
<td>Either input or output (partial check)</td>
<td>Service chain check (full)</td>
<td>Information Quality Assurance</td>
</tr>
<tr>
<td><strong>Cross Verified</strong></td>
<td>Not defined</td>
<td>Data from one or more sources – reliability not confirmed</td>
<td>Data from one or more sources – reliability confirmed</td>
<td>Collaboration from more than one source (data fusion) – reliability confirmed</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Service Grade</strong></td>
<td>Not guaranteed</td>
<td>Guaranteed to a time interval</td>
<td>In real time</td>
<td></td>
</tr>
<tr>
<td><strong>Forecast Horizon</strong></td>
<td>Only current situation</td>
<td>Current situation and short time prediction</td>
<td>Current situation and short as well as long time prediction</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**

See “Traveller Information Services REFERENCE DOCUMENT, TIS Deployment Guideline Annex, Version 01-02-00”, chapter 5.1 “Levels of Service and Quality” for core criteria definitions (Accessibility, Availability, Timeliness, Update Frequency, Quality Assurance, Cross Verified and Accuracy).

- **Accuracy**: This criterion is covered by
  - LoS: Level of Detail and
  - LoQ: Forecast Horizon.
- **Service Grade**: A specific traffic condition and travel time information quality criterion, in which the service is guaranteed.
- **Forecast Horizon**: A specific traffic condition and travel time information quality criterion, which defines the prediction time for the service.
2.6.3 Level of Service Criteria related to Operating Environment

Level of service requirement:

- **LoSR1**: According to the OE where the service is implemented, the minimum and maximum LoS must respect the Level of Service to Operating Environment mapping table.

**Note**: Level of services concerning the core criteria “User interface” has only to be considered for traffic condition information (not relevant for travel times).

**Note**: The Level of Service to Operating Environment mapping table is not an outcome of a specific scientific analysis but an expert view output.

### Table 5: Level of Service to Operating Environment mapping table

<table>
<thead>
<tr>
<th>TIS-DG03: TRAFFIC CONDITION AND TRAVEL TIME INFORMATION SERVICES</th>
<th>EasyWay OPERATING ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria for the Levels of Service</td>
<td>C1</td>
</tr>
<tr>
<td><strong>User Interface</strong></td>
<td>C</td>
</tr>
<tr>
<td>Information available is capable of being provided independent of language</td>
<td>B</td>
</tr>
<tr>
<td>Information available is capable of being provided in a common and shared language (English)</td>
<td>A</td>
</tr>
<tr>
<td>One fixed language (all official languages)</td>
<td></td>
</tr>
<tr>
<td>Neighbouring Provision</td>
<td>C</td>
</tr>
<tr>
<td>Neighbouring and beyond information provider exchange</td>
<td>B</td>
</tr>
<tr>
<td>Information exchange to neighbouring only</td>
<td>A</td>
</tr>
<tr>
<td>No information exchange</td>
<td></td>
</tr>
<tr>
<td>Neighbouring Provision</td>
<td>C</td>
</tr>
<tr>
<td>Neighbouring and beyond information provider exchange</td>
<td>B</td>
</tr>
<tr>
<td>Information exchange to neighbouring only</td>
<td>A</td>
</tr>
<tr>
<td>No information exchange</td>
<td></td>
</tr>
<tr>
<td>Local and secondary Network Information</td>
<td>C</td>
</tr>
<tr>
<td>Additional information on local routes with impact on the TEN-T (road network)</td>
<td>B</td>
</tr>
<tr>
<td>Exchange and use of information for more strategic non TEN-T (road network)</td>
<td>A</td>
</tr>
<tr>
<td>Only traffic condition and travel time information on TEN-T (road network)</td>
<td></td>
</tr>
<tr>
<td>Level of Detail (Location Reference)</td>
<td>C</td>
</tr>
<tr>
<td>Road segment specific (approx 1 km)</td>
<td>B</td>
</tr>
<tr>
<td>Route specific segments (between 2 junctions)</td>
<td>A</td>
</tr>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Static/Dynamic</td>
<td>C</td>
</tr>
<tr>
<td>Static/historical and fully dynamic and fully</td>
<td>B</td>
</tr>
<tr>
<td>Static/historical and partly dynamic and fully</td>
<td>A</td>
</tr>
<tr>
<td>Static/historical only</td>
<td></td>
</tr>
</tbody>
</table>

**Recommendations for LoS per OE:**

- **M**: Minimum LoS recommended
- **O**: Optimum LoS recommended
- **CM**: Minimum = Optimum
- **NA**: Non applicable / non relevant
3 Part B: Supplementary Information

3.1 Examples of deployment

3.1.1 Roadside guidance systems

Roadside guidance systems are installed on the motorways and will be operated by the road authorities or the private motorway companies. The systems consist of VMS or dynamic signage with predefined content. The systems display directional information, diversion information but also information about the traffic conditions incl. travel-time, warnings and weather conditions. Due to the installation on the road the service is usable only on-trip.

Figure 7: VMS on the A10 near Madrid in Spain

Figure 8: VMS on the A3 near Frankfurt am Main in Hessen (Germany)
3.1.2 Internet portals

Internet portals will be operated by road authorities, private motorway companies or service providers (e.g. public or private broadcasters). The information which they provide is about warnings, weather conditions or traffic conditions. Due to the necessary equipment (Internet access) the service is mainly used as pre-trip service. In general the service is common but some services provide personalised information. The language of the service depends on the provider but can easily be provided language independent.

The information on Internet portals will be shown on maps, as text or as images from roadside CCTVs.
Figure 11: Website "www.trafficengland.com" of the Highways Agency

Figure 12: Website "www.autobahn.nrw.de" of the road authority of North Rhine-Westphalia
3.1.3 Navigation systems

Navigation systems provide routing information to the chosen destination. The system uses static or dynamic information to reach the destination. The dynamic information can be provided via RDS-TMC or TPEG. With the provided dynamic information a flexible routing is possible and takes into account the current traffic condition, routing information and warnings. The service can be given to the road user via voice announcements, graphical display or a combination of both. The information can only be used on-trip and is language independent.

3.1.4 Mobile devices

Information which can be called with mobile phones by the road users will be provided by radio broadcasters or private service providers. The coverage of the different services is Europe-wide. Due to the determination of the geographical position via the mobile device the information can be provided personalised but also common. It can be given via Short Message Service, voice announcements or services, which depends on the provider. Furthermore web-enable devices can also recall specific web-based traffic information. The information which will be provided is about the traffic condition, warnings and weather conditions. The service is used as pre-trip as well as on-trip information. Due to safety reasons the national regulations of the use of mobile phones while driving has to be taken into account.
Both, navigation systems as well as mobile devices have the great advantage that they can give individualized information and restrictions (e.g. vehicle-type-based speed limits).

3.1.5 RDS-TMC / TPEG

- **RDS-TMC**

RDS-TMC is a specific application of FM RDS used for broadcasting real-time traffic and weather information. Data messages are received silently and decoded by a TMC-equipped navigation system or radio and offering dynamic route guidance. The data is language independent and can be used as pre-trip or on-trip information service. RDS-TMC is a global standard and covers a large percentage of the TERN. Many parts of the TERN have no RDS-TMC coverage, however this could be provided at any time by commercial entities without market intervention by the State, or by the State if considered appropriate. The referencing based on the country-specific location code lists for the strategic European road network.

- **TPEG**

TPEG is a standardised world-wide technology which delivers all types of traffic and travel information content by different digital channels, e.g. digital Radio (DAB), Internet. It is language independent and can be used as on-trip or pre-trip information. The TPEG applications use a common location referencing method for all devices presenting text or icons on a map display.

3.1.6 Radio

Common radio broadcasters or special traffic radio broadcasters are available all over Europe. They give traffic condition information, warning information and weather information to the road user. Radio services may consist of spoken messages (amongst others the instantaneous warnings for wrong-way drivers), text to speech services or data services, all editorially provided with appropriate quality control.

This information is common and not personalised to the specific road user, but can be tailored to a specific area or region. The character and the mass of information depend on each broadcaster.

The information is in general not language independent and is normally an on-trip service but can also be used as pre-trip service. Broadcasters can be public or private bodies.

Figure 15: Traffic radio in France

Figure 16: Traffic radio in Dublin, Ireland
3.1.7 Videotext

Videotext is provided in parallel to the TV programme. The broadcasting stations provide relevant traffic information (e.g. traffic conditions, warnings, regional traffic information of conurbations). The use of videotext is only a pre-trip service and usually not language independent.

Videotext services are currently being enhanced: novel, Internet-supported portals offer ease-of-use information services for HDTVs and Internet-connected TVs.

![Figure 18: Traffic information via videotext of the German broadcaster WDR](image)

3.1.8 Television

Some broadcasters in Europe provide special services on TV concerning the publication of traffic conditions. Particularly during the morning peak hours or in the case of poor weather conditions, large events or significant travel disruption. This service is not language independent and only a pre-trip service. The service on TV will be shown on maps, as texts, or on CCTV live streams.

![Figure 19: Traffic Information via television on France 2](image)

3.1.9 Audiotex in France

French Ministry provides a 24/7 free phone service about the road and motorway conditions throughout France. Audiotex is part of the Bison Futé service. The key objective is to provide as many road users as possible information in real-time. The provided information consist of roadworks, accidents, events, weather conditions, congestions, disruptions and diversions which is coming amongst others from the Gendarmerie, the Police, the road infrastructure, and the private motorway companies. Beside the phone service the website
www.bison-fute.equipement.gouv.fr is in operation which provides further traffic related information for France.

The information is checked, analysed and then passed on to the Bison Futé network, comprising the national centre for traffic information and seven regional traffic co-ordination and information centres covered all France. The availability and reliability of this phone service leads to a high level of quality.

### 3.1.10 The Traffic Scotland Web Service

<table>
<thead>
<tr>
<th>Euro-Region</th>
<th>EasyWay Streetwise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Scotland, UK</td>
</tr>
<tr>
<td>Location</td>
<td>Scotland</td>
</tr>
<tr>
<td>Name of organisation</td>
<td>Transport Scotland</td>
</tr>
<tr>
<td>Contact Name</td>
<td>Peter Cullen</td>
</tr>
<tr>
<td>Contact Email</td>
<td><a href="mailto:Peter.Cullen@transportscotland.gsi.gov.uk">Peter.Cullen@transportscotland.gsi.gov.uk</a></td>
</tr>
<tr>
<td>Web link</td>
<td><a href="http://www.trafficscotland.org">www.trafficscotland.org</a> or <a href="http://m.trafficscotland.org">m.trafficscotland.org</a> (mobile site)</td>
</tr>
</tbody>
</table>

#### Service Description

The Traffic Scotland Web Service is a vital element of the integrated Traffic Management and Control System. Traffic Scotland provides real-time information on the Scottish road network to the travelling public. The purpose of the service is to help drivers make informed choices about the timing, routing and travel mode for current or future journeys.

Traffic Scotland is constantly looking at more effective ways to reach the travelling public using methods that match with modern technology-driven lifestyles (internet radio, twitter feed, mobile site, iPhone app).

All Traffic Scotland services are free to the public.

#### Real Time Event Details

With specific reference to real-time information, the following detail is provided:

<table>
<thead>
<tr>
<th>Incident</th>
<th>1) Date (day, date)</th>
<th>2) Start Time (hh.mm.ss)</th>
<th>3) Location (point / junction / route)</th>
<th>4) Direction (i.e. northbound)</th>
<th>5) Type (accident, fluid spill)</th>
<th>6) Description of impact (lanes closed, lanes restricted etc)</th>
</tr>
</thead>
</table>

Figure 20: Logo of the website and phone service Bison Futé
Roadworks
1) Reported delay information
2) Week of commencement
3) Start Date / Time (Date, Date, Time)
4) End Date / Time (Date, Date, Time)
5) Location(point / junction/route)
6) Description (work being carried out)
7) Days affected

Level of service:

User interface
All text is provided in English
On mapping information is provided independent of language:
- Icons used to show incidents, queues, roadworks
- Colours used to road congestion / travel time links

Neighbouring Provision
DATEX II is used to exchange traffic data (incidents and travel times) with the Highways Agency in England

Local and secondary Network Information
DATEX II used to exchange travel time data with Edinburgh City Council connecting Transport Scotland TEN-T and local interfacing routes
Cooperation with external partners (i.e. organisers, local authorities, and the police) is also key when providing traffic information to the public on large events.

Level of Detail (Location Reference)
Dependant on type:
- Point location (i.e. bridge / junction) for incidents
- Junction reference (i.e. M8 J1 – J3) for roadworks / hazards / queues

Icons Used

<table>
<thead>
<tr>
<th>Icon</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![⚠️]</td>
<td>Current Incidents - Current incidents on the road network e.g. Accidents</td>
</tr>
<tr>
<td>![⚠️]</td>
<td>Roadwork - Roadworks currently being undertaken on the road network.</td>
</tr>
<tr>
<td>![⚠️]</td>
<td>Queue - Current traffic queues on the road network</td>
</tr>
<tr>
<td>![⚠️]</td>
<td>Planned Roadwork - Future roadworks on the road network</td>
</tr>
<tr>
<td>![🔍]</td>
<td>Park and Ride - Park and Ride information</td>
</tr>
<tr>
<td>🔄</td>
<td>Congestion - Real-time traffic congestion on selected areas of the road network</td>
</tr>
<tr>
<td>⚠️</td>
<td>Congested - Current traffic speed and flow indicates congestion at that point (also used for JT conditions)</td>
</tr>
</tbody>
</table>
Busy - Current traffic speed and flow indicates a large number of vehicles at that point but not necessarily queued.

Free Flow - Traffic is likely to be free-flowing.

No Data - No data is currently available for this point.

Traffic Scotland Screen shots

Ways to access Traffic Scotland

Example of map based real-time traffic information

Real time displays on Traffic Scotland mobile version
3.2 Business Model

A general overarching description of the key actors, their roles in the value chain and the related conditions for TIS-service provision is outlined in the "Traveller Information Services REFERENCE DOCUMENT, TIS Deployment Guideline Annex, Version 01-02-00":

Chapter 3.1 "Introduction to key actors in the traveller information chain" and
Chapter 3.2 "Conditions for Service Provision - Business Model"

For Additional information see chapter 2.3 Organisational requirements.
## Annex A: Compliance Checklist

### 4.1 Compliance checklist "must"

<table>
<thead>
<tr>
<th>#</th>
<th>Requirement</th>
<th>Fulfilled?</th>
<th>If no – quote of insurmountable reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Functional requirements</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR1</td>
<td>Functional decomposition into sub-functions with the provision of interfaces must be carried out to enable interoperability in those cases that the service is provided by more than one organisation (and should be carried out in any case to be prepared for an easy functional decomposition as may be the case in the future)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR2</td>
<td>All provided data must be based on as well a consistent geographic reference model as a time stamp model, which must be part of data description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR4</td>
<td>Source, scope and quality of data provided by content owners to content providers must be defined by the partners and must be part of data interface description.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Functional requirements: interfaces</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR7</td>
<td>To enable interoperability between all involved parties the sub-functions data collection and data fusion and processing must - depending on the used data type for the data fusion and processing - require/provide an interface 1 with one or several of the following information structures:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• traffic volume and speed, occupation rate (e.g. collected by loops, radar, ...)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• trajectories (e.g. collected by APNR - automatic number plate recognition, ...)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• floating car data (e.g. collected by Taxi FCD, Navigation Systems, Phone Data, ...)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Event-based information (provided by police, road authorities, ...)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Historic data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR8</td>
<td>To enable interoperability between all involved parties the sub-functions data fusion and processing and service</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
provision **must** require/provide an interface with the following traffic condition and information structure

- Level of Service
- Traffic states (actual situation and forecasted for 30’, 1 hour and seven days)
- Travel times

**Organisational requirements:**

**OR1**

The organisational and operational structure of the service as well as the role of each organisation/body and its exact tasks in the chain **must** be defined

**OR2**

All for successful implementation of a "Traffic condition and travel time information service" necessary organisational aspects **must** be documented and signed of all involved parties/partners in form of a Common partner arrangement/MoU - Memorandum of understanding, which fixes the co-operation.

**OR3**

In case of involving private partners delivering private generated data for "Traffic condition and travel time information service“ a contract (with service level agreement) be **must** developed and closed wherever a "Traffic condition and travel time information service" relies on receiving privately generated data.

**OR4**

All for successful implementation of a "Traffic condition and travel time information service" necessary collaboration processes/workflows and interfaces **must** be described

**OR5**

The information provision **must** be in accordance with any management plans (TMP, see TMS-DG07) which are in operation of the road authorities or traffic management centres

**Technical requirements**

**TR1**

To enable interoperability between different actors involved in the traffic condition and travel time service value chain the corresponding DATEXII-Profiles **must** be used for **interface 1**

**TR2**

To enable interoperability between different organisations involved in the
### Required Common Look & Feel

**CL&FR2** To enable intuitive perception of information by the user, service providers must use several colours for traffic state representations on digital maps, chosen on a commonly shared intuitive order. The following colours must be used:

- White, grey, blue... (depending on the display background) – no information available
- Green - free traffic (free flow)
- Yellow/amber/orange - heavy traffic
- Red - congested traffic
- Black - stationary traffic (impossible)

### Level of Service Requirements

**LoSR1** According to the OE where the service is implemented, the minimum and maximum LoS must respect the Level of Service to Operating Environment mapping table.

### 4.2 Compliance checklist "should"

<table>
<thead>
<tr>
<th>#</th>
<th>Requirement</th>
<th>Fulfilled?</th>
<th>If no – explanation of deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>Yes</strong></td>
<td><strong>No</strong></td>
</tr>
</tbody>
</table>

### Functional requirements

**FR5** When providing a customer oriented traffic condition and travel time information service the users benefit can be distinguished between:

- Public available traffic information (paid by public bodies) and
- Private traffic information (added value with special user payment),

which should be clearly distinguished in case of private organisations involved in the value chain (see also business model).

**FR6** The area of information dissemination should be defined in relation to the media used (particularly concerning the broadcast services which are location-dependent)
Organisational requirements:

| OR6 | In cases roles are taken by two or more organisations the following organisational requirements should be respected for two service life cycle phases:  
|     | • ITS-service elaboration  
|     | • ITS-Service operation and quality management (concerning content provider and service operator) |

Technical requirements

None

Required Common Look & Feel

| CL&FR1 | The display of signs/pictograms on VMS or other end-user devices should be conforming to the Vienna Convention for use on VMS, Annex IX and Annex 10 of ECE/TRANS/WP.1/119/Rev.2 27 May 2010 (see [http://www.unece.org/index.php?id=17582](http://www.unece.org/index.php?id=17582)) and in line with the requirements of the EasyWay Variable Message Signs Harmonisation Guidelines Part I and Part II. |
| CL&FR3 | The display of travel times and delay times on VMS or other end-user devices (websites, navigation systems) should respect the following format: <XX> min (+YY) |
| CL&FR4 | It should always be indicated for which location (intersection, exit, city ...) the travel time displayed is valid. |

Level of Service Requirements

None

4.3 Compliance checklist "may"

<table>
<thead>
<tr>
<th>#</th>
<th>Requirement</th>
<th>Fulfilled?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td><strong>Functional requirements</strong></td>
<td></td>
</tr>
<tr>
<td>FR3</td>
<td>Beneath real time data also historic data may be used to generate traffic condition and real time predictions.</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
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<td>------</td>
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<td></td>
</tr>
<tr>
<td><strong>Required Common Look &amp; Feel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Level of Service Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5 Annex B: Bibliography


6 Annex C: Endnotes