Traffic Management Services

HGV OVERTAKING BAN

Deployment guideline

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Service at a glance

SERVICE DEFINITION

HGV Overtaking ban service means to channel the heavy goods vehicles onto a single lane (slow lane).

The heavy goods vehicles overtaking ban implementation is one of the traffic management measure allowing traffic managers and road operators to propose solution for a better fluidity of their network during peak period. This traffic control measure constitutes one of the priority services to improve the cohabitation of heavy goods vehicles and private cars on network with high level traffic.

SERVICE OBJECTIVES

Objectives:
- Monitor and manage the HGV traffic flow onto the motorway network
- Improve journey times for light vehicles and safety by reducing vehicle queues caused by slow lorries overtaking
- Ensure a better acceptance of heavy goods vehicles by the other road users.

The service allows traffic managers and road operators to support better fluidity on the network during peak period.

SERVICE BENEFIT RADAR

HGV OVERTAKING BAN

SAFETY

ENVIRONMENT

EFFICIENCY

EUROPEAN DIMENSION

There are numerous aspects of HGV overtaking ban that differ from one installation to another across
EasyWay regions. These include the location and frequency of VMS, type and number of detectors, control strategies, etc.

Harmonisation relating to HGV overtaking ban are focused on end users aspects (drivers and operators):

- Pre-signing on the motorway access and service or rest areas exit
- VMS frequency along motorway sections
- Use of icons recommended by the Vienna Convention

Coherence with other dissemination tools, in particular with on board devices is ensured thanks to the use of DATEX II which guarantees:

- a solid dimension in terms of service standardisation and harmonisation,
- the information exchange among traffic managers
- a wide dissemination thanks to the facilities for providing standardised Datex II publications towards service providers
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<th>Definition</th>
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<tbody>
<tr>
<td>CO</td>
<td>Carbon monoxide</td>
</tr>
<tr>
<td>CO2</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>HGV</td>
<td>Heavy Good Vehicles</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communications Infrastructure</td>
</tr>
<tr>
<td>ITS</td>
<td>Intelligent Transport Systems</td>
</tr>
<tr>
<td>LoS</td>
<td>Level of Service</td>
</tr>
<tr>
<td>NOx</td>
<td>Oxides of nitrogen</td>
</tr>
<tr>
<td>OE</td>
<td>Operating Environment</td>
</tr>
<tr>
<td>RDS TMC</td>
<td>Radio Data System Traffic Message Chanel</td>
</tr>
<tr>
<td>TERN</td>
<td>Trans European Road Network</td>
</tr>
<tr>
<td>VMS</td>
<td>Variable Message Sign</td>
</tr>
</tbody>
</table>
1 Introduction

1.1 The concept of the EasyWay Deployment Guidelines

1.1.1 Preliminary note

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 ‘MUST’. ‘MUST NOT’ 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. “Advices” 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

During peak or congested periods on the main carriageway, HGV Overtaking may cause vehicles to break or change lanes giving rise to higher occupancy and lower headways. This causes drivers to reduce their speed.

This speed reduction often causes following vehicles to break, resulting in a propagation wave of slowing vehicles that travels back along the line of traffic on the main carriageway upstream where the HGV overtakes.

Traffic congestions on the network due to HGV overtaking with low speed differential result in traffic slowdown in the middle and/or left lanes. The major impact is a decreased capacity of the network.

Additionally, during peak periods when congestion is increased there may also be a higher risk of accidents.

HGV overtaking ban service is implemented through the deployment of ban signals on the main carriageway. This service intends to organize flow of heavy goods vehicles on the motorway network by channelling them onto a single lane (slow lane) in order to improve the traffic flow conditions.

1.2.1.2 What is the Vision?

Public opinion considers that heavy goods vehicles are dangerous and disturb the traffic when overtaking. This fact requires the research for means to improve journey times and safety by reducing vehicle queues caused by slow lorries overtaking while ensuring a better acceptance of heavy goods vehicles by the other road users.

Heavy goods vehicles overtaking ban implementation on long distances (several kilometres) is a traffic management measures enabling traffic managers and road operators to propose solution for a better fluidity of their network during peak periods. This measure constitutes one of the priority services to improve cohabitation between heavy goods vehicles and private cars drivers on high traffic networks.

The overtaking ban is implemented during periods where the network capacity reaches its saturation point or when trucks are too numerous. According to the context and objectives, the deployment of overtaking ban can be managed in static way (the overtaking can be permanent or intermittent) or in dynamic way.

| **Permanent overtaking ban**: the oldest and more frequent. They are signalled by a fixed road sign which can be completed by a sign précising the tonnage of the concerned vehicle (without additional sign ban concerns HGV> 3.5t.). |
| **Intermittent overtaking ban**: additional information related to the applicable ban hours (or specific day, ie working day) transforms this permanent ban to an intermittent one |
| **Dynamic overtaking ban**: information is transmitted to HGV drivers through Variable Messages Signs (VMS). The system requires data collection and analysis of traffic condition tools to activate the measure in accordance with the thresholds (i.e.: flow or percentage of HGV). The overtaking ban can be managed in real time or during planned peak traffic periods. |
Recommendations and requirements presented in Part A of this Guideline mainly concern the dynamic overtaking ban service. HGV overtaking ban can be deployed on 2 and 3 lane (or more) highways. Nevertheless, due to national regulations, such a service is only allowed on 2 lane highways in some countries (Netherlands for example).

The deployment of HGV overtaking ban is generally assessed against the following parameters:

- network typology (number of entrances and exits, slopes, etc.),
- percentage of HGV,
- number of HGV,
- traffic flow,
- period (in some countries no ban is issued during the weekend)

### 1.2.1.3 What are the Missions?

The deployed HGV overtaking ban intends to:

- Monitor and manage the HGV traffic flow onto the motorway network,
- Improve journey duration and safety for personal vehicles by reducing queues caused by slow lorries overtaking,
- Ensure a better acceptance of heavy goods vehicles by other road users.

### 1.2.1.4 EasyWay harmonization focus

The main focus of this EasyWay Deployment Guideline stands in displaying dynamic HGV overtaking ban service on Variable Message Signs (VMS). These VMS should be operated along the route in a European harmonized way.

A mid-term focus is to ensure coherent information coordination with other devices when the service is activated. This means that the Internet and navigation pre-trip and on-trip information services must be able to display the same on-trip information used with VMS support.

### 1.2.1.5 Distinction to other ITS-services

Relevant information for this service is:

- Status of traffic conditions on the network (percentage-number of HGVs, traffic flow, period)

Relevant complementary information, which is not content of this Deployment Guidelines and will be covered by other DG, is:

- Pre-trip and on-trip information services which may be used to inform en-route or pre-trip users about the current operational status of the HGV overtaking ban (see TIS DG01-DG02).
- Recommendation about VMS use (see VMS DG01-DG02).
- Information provision should be coordinated with traffic management plans (TMP, see TMS-DG07) operated by road authorities or traffic management centres.
1.2.2 Contribution to EasyWay Objectives

HGV overtaking ban evaluation objectives, methodologies and methods of data collection differ from country to country. The figure below sketches the relationship between HGV overtaking ban and the EasyWay objectives. Network efficiency and safety are the main benefits of the service.

1.2.2.1 Service radar

The graph below provides a quantification of the service added value regarding the three main objectives of EasyWay which are: safety, efficiency and environment.

![HGV OVERTAKING BAN Radar](image)

Figure 1: HGV Overtaking ban radar

1.2.2.2 Safety

The previous deployments of HGV overtaking ban have demonstrated safety improvement. This is particularly accurate on sections where the percentage of accidents due to high level of lorry traffic is high.

One additional major impact of this measure concerns the psychological comfort brought to car drivers. Investigations in some countries show that dynamic overtaking bans for HGVs (concentrated on peak hours) provide considerably better results than static overtaking bans for HGVs.

1.2.2.3 Environmental impact

Improved network efficiency and network management help to reduce vehicles’ emissions. Following the French experimentation of this service on ASF network during summer 2007 peak traffic period a decrease of polluting emissions was recorded (-500 tons of CO2) due to the congestion drop (-7%).

1.2.2.4 Network efficiency

HGV overtaking ban positively impacts the network in terms of efficiency. The existing deployments and evaluations show:

- A speed homogenisation on each lane,
- An average speed increase on each lane in case of light traffic (< 2000 veh/h for 2 lanes),
- An increase of light vehicle speed in case of heavy traffic (> 2000/h for 2 lanes),
- A decrease of traffic jams during peak traffic periods.

The service contributes to optimise the use of the network especially on sections where the percentage of HGV traffic superior to 10%. This potentially concerns an important part of the TERN Network.
1.2.3 State of the art

Many trials and deployments of this service have been achieved over Europe. Evaluations have been conducted for some deployments and experimentations. Main results and effects of the HGV overtaking ban evaluations conducted in Europe are presented in Part B of this guideline.

The different trials provide results which underline the main advantages or disadvantages of this traffic management service implementation from a user point of view as well as for the road traffic manager perspectives.

1.2.4 European Dimension

There are numerous aspects of HGV overtaking ban that differ from one installation to another across EasyWay regions. These include the location and frequency of VMS, type and number of detectors, control strategies, etc.

Harmonisation relating to HGV overtaking ban should be focused on end-user aspects ensuring road users across Europe encounter similar conditions when driving on the TERN network. This includes:

- Pre-signing on the motorway access and service or rest areas exit – see 2.5 Common Look and Feel
- VMS frequency exit – see 2.5 Common Look and Feel
- Use of icons recommended by the Vienna Convention exit – see 2.5 Common Look and Feel

In a mid-term perspective coherence with on board devices and online information must be ensured. Therefore dynamic HGV Overtaking ban service should be displayed real time on-board (navigation systems, smartphones) when activated. For this purpose, use of DATEX II guarantees:

- A solid standardisation and harmonisation basis,
- Information exchange among traffic managers,
- Large dissemination thanks to standardised Datex II publications for service providers.
2 Part A: Harmonization Requirements

2.1 Service Definition

HGV Overtaking ban service means to channel the heavy goods vehicles in a single lane (slow lane). This measure improves the traffic flow conditions by reducing vehicle queues caused by slow HGV overtaking. It also contributes to ensuring a better acceptance of heavy goods vehicles by the other road users.

The heavy goods vehicles overtaking ban implementation is one of the traffic management measure allowing traffic managers and road operators to propose solution for a better fluidity of their network during peak period. This traffic control measure constitutes one of the priority services to improve the cohabitation of heavy goods vehicles and private cars on network with high traffic level.

2.2 Functional Requirements

2.2.1 Functional architecture

The following table and diagrams show the typical functional and information architecture of the HGV Overtaking ban service.

**FR1**: HGV Overtaking ban service implementation **must** be carried out following the functional decomposition according to the seven following sub functions:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A0</td>
<td>Prepare the HGV Overtaking ban implementation</td>
</tr>
<tr>
<td>A1</td>
<td>Collect and analyse data transmitted from monitoring systems</td>
</tr>
<tr>
<td>A2</td>
<td>Decide the relevant strategy HGV Overtaking ban implementation to apply</td>
</tr>
<tr>
<td>A3</td>
<td>Inform partners and users about implementation</td>
</tr>
<tr>
<td>A4</td>
<td>Make the users sensitive of the measure and enforce the implementation</td>
</tr>
<tr>
<td>A5</td>
<td>Track the decision for assessment use</td>
</tr>
<tr>
<td>A6</td>
<td>Evaluate and assess, measure the impacts in order to provide recommendation and improvement</td>
</tr>
</tbody>
</table>

Table 2: sub-functions 1
2.2.2 Functional decomposition\(^1\) and interfaces

**Sub-function A1 “Data collection and analysis”**

The devices 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.

**FR2:** data collection system must be able to detect in real time vehicle flow, speed and HGV%.

### 2.3 Organisational Requirements

The implementation the HGV Overtaking ban have different objectives, depending on the traffic conditions and periods:

- Improve network fluidity,
- Improve safety,
- Improve user comfort.

Whatever the initial objectives the awaited benefits of the service rely on stakeholders’ involvement for its implementation and road users acceptance on the network.

**Organisational Architecture**

---

\(^1\)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.
OR1: the organisational and operational structure of the service as well as the role of each organisation/body and its tasks must be defined

The service implementation requires the involvement of various organisations which are in charge of the following general roles:

Road authorities:
The road authorities are responsible for the decision and the deployment of the service. They have to conduct preliminary studies:

- Launch a detailed traffic study in order to define exactly the area where the service will be implemented,
- Identify the level of accidents on the network (with regard to HGV involvement),
- Identify the existing collection systems, control systems and information systems,
- Identify the existing HGV ban regulations and constraints regulation for implementing the service.

To implement the service, they are in charge of:

- Select the sections where the ban will be implemented,
- Validate the thresholds for the strategy activation (permanent, intermittent, dynamic),
- Study and estimate the necessary additional equipment and systems to install,
- Plan the organisational and technical aspects of the evaluation,
- Involve partners,
- Communication actions,
- Establish the administrative and regulation procedures before installing such a ban on the network.

Road operators
Following decision taken by the road authorities there are mainly in charge to:

- conduct the relevant studies,
- implement the technical equipment and systems,
- record data for evaluation purposes,
- inform partners when the ban is operated (especially Police) in case of dynamic ban,
- inform service operators when the ban is operated.

OR2: road operators must be able to provide the dynamic HGV overtaking ban information available in real time by a relevant interface providing real DATEX II publications.

Law and order forces
Police is mainly involved for the HGV overtaking ban enforcement. In case of permanent or intermittent ban they can plan enforcement actions on their own.

Nevertheless dynamic ban implementation requires specific information actions from the Road operators: the ban is only operational when thresholds for strategy activation are reached. In case of enforcement
implementation, Police patrols need to be informed by road operator in real time to plan intervention. Enforcement may concern different type of control:

- HGV overtaking ban compliance
- Speed compliance
- Inter-vehicle distance respect (mainly for HGV)

**HGV representatives**

Positive impacts of the service result from the respect of the ban by HGV drivers. Such a measure requires coherent communication actions towards HGV representatives. Road authorities are in charge of managing the pre trip communication actions through regular radio messages, internet, newspaper. In case of dynamic ban road operators manage real time on trip information through VMS, radio, RDS-TMC. It is important to stress to HGV operators and drivers the benefits of accident savings and the very small increase to journey times for HGVs.

HGV representatives (trade union) have to be associated as soon as possible in the ban process, so that they can facilitate information transfer to their HGV members.

**Media**

They make informed the users with the existence of the measure, with its interest and objectives in order to increase its future respect.

**Services operators and on board navigation systems**

These operators need to be aware of the measure to integrate it in the pre-trip or real time services they manage. This implies that road operators make available the dynamic information by a relevant interface providing for instance real time DATEX II publications.

Permanent ban may be integrated as restriction in the navigation systems; dynamic ban must be disseminated to on board unit through real time services using DATEX II interfaces.

**OR3:** Services operators must be able to integrate the DATEX II publications provided by the road operators when they publish the ban information measure.

## 2.4 Technical Requirements

### 2.4.1 Required ICT Infrastructure

The deployment of overtaking by static way does not require a specific ITS infrastructure, deployment of dynamic system can make use of ICT infrastructures developed for other ITS services. For this dynamic service the required infrastructure are:

**Data collection**

**Traffic counting stations**

Traffic counting stations constitute the essential data collection entry for the functioning of this traffic management measure. Precision and quality of measure are essential for the ability to react as well as for the response time of the HGV overtaking ban which has been determined according to flow level or HGV percentage.

**TR1:** the data collection system must be able to detect in real time the following parameters: vehicle flow, speed and HGV%.
TR2: the data collection system must be installed:

- before the ban (at least one counting point)
- along the ban (at least one counting point between each entry / exit of the motorway network)

TR3: After the ban area a station to collect journey time information for the evaluation purposes may be implemented.

Video surveillance

Video surveillance is generally used for enforcement purposes through cameras installed along the ban area. Video surveillance is also interesting for traffic managers to assess the measure on vehicles inter-distance (implementation of chevron road markings can be used to improve vehicle spacing) and potential difficulties related to the exit of personal vehicles.

Control system

The system may be adapted to the characteristics of the road section as well as to the existing computerised systems and the current equipment. Two solutions are relevant:

- An autonomous analysis system, recommended when all equipment systems are dedicated to the measure or in transitory phase for experimentation.
- An integrated solution which is generally better because it offers possibility to interact with other traffic management measures and equipment.

Information

It is quite important to largely inform users on the activation of the measure should it be a recurrent activation (i.e. home-to-work) or temporary (summer holiday). Pre trip information could be managed through regular radio messages, internet and newspaper. Two main objectives for the information:

- Make acquaint the users with the existence of the measure, with its interest and objectives in order to ensure compliance
- Inform users in real time trough VMS, Radio, on board devices, ...

Regarding the timing and area, the following table presents the different information means which may be used:

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>VMS (DYNAMIC SERVICE)</th>
<th>FIX ROAD SIGN</th>
<th>IN VEHICLE (RDS-TMC FOR EXAMPLE)</th>
<th>RADIOS</th>
<th>INTERNET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before departure</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Before the measure area</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In measure area</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In exit area</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At the motorway access</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 possible information means 1
2.4.2 Standards and Agreements: Existing and Required

Standards concern the technical equipment (traffic stations / Video / VMS..).

**TR4** The use of VMS must respect the recommended signs of the Vienna Convention for use on VMS, Annex IX of ECE/TRANS/WP.1/119/Rev.2 27 May 2010.

Equipments which need to be installed must be compatible with the Traffic Control Centre. This compatibility will ensure the interoperability of systems and will allow the possibility to use the dedicated HGV overtaking ban’s equipment for another type of traffic management actions if needed.

2.4.3 DATEX II Profile

One of the major deliverables of the DATEX II specifications is to offer a toolbox for applying one of the most common IT technologies for data definition: the Unified Modelling Language (UML, ISO/IEC 19501:2005).

The use of DATEX II is required for the service implementation. Providing formal data definition for all implementations ensures technical interoperability (i.e. “Plug & Play”). Interfaces generated from the same data definition ensure road operators the ability to exchange and process data.

This integration of the DATEX II profile in the DG provides a solid dimension in terms of service standardisation and harmonisation. It also guarantees information exchange among traffic managers and a wide dissemination of traffic information and traffic management services thanks to standardised Datex II publications.

HGV overtaking ban is characterised by the following elements:

- Location of the ban
- Length affected by the measure
- Type of vehicle concerned by the ban
These elements and the overtaking ban **must** be described in the DATEX II Model as follows:

**Location**

The DATEX II model offers various possibilities for describing location. Location referencing can be restricted to linear locations. The **SupplementaryPositionalDescription** feature is needed to precise the length of the ban.
Length

Description of the Overtaking length ban has to be specified with the attribute `lengthAffected` and defined in metres.

```
Figure 5: length DII Profile 1 1
```

**Type of vehicle**

The restriction of measures for particular types of vehicles needs to be described in the `VehicleCharacteristics` class, select lorry in the `VehicleTypeEnum` of this class. Tonnage of the concerned vehicles must be specified in `GrossWeightCharacteristic`.

```
Figure 6: vehicle DII Profile 1
```
Overtaking ban

The mapping of information related to overtaking ban into the DATEX II level A is easy. DATEX II has a dedicated class for this type of information called GeneralNetworkManagement. In this class, select the attribute noOvertaking in the generalNetworkManagementTypeEnum.

Important: this class is a specialisation of the SituationRecord class, hence the information regarding Overtaking ban shall be published via a SituationPublication for any dissemination of the information.

2.5 Common Look & Feel

2.5.1 Length of the ban section

Some evaluation results showed that for a better acceptance of the service, the ban should be implemented on sections from 5 to 20 km. Above this length HGV drivers tend not respect the ban. One observes that it depends on the cultural drivers’ approach which can varies from a country to another, i.e. in Netherlands the ban is applied on longer sections with a good truck drivers’ respect.

CL&FR1: A wide area deployment of this service may limit the length for the ban to 20 km on a section
The following figure summarises this recommendation:

![Diagram](image)

**Figure 8: Length of ban configuration 1**

### 2.5.2 VMS Information signalisation

#### 2.5.2.1 Beginning of the ban VMS

**CL&FR2:** The dynamic HGV overtaking ban must require the use of VMS display. The icon is the **XC, 13ba** panel, recommended by the Vienna Convention:

![XC, 13ba panel 1](image)

**Figure 9: XC, 13ba panel 1**

In addition to the use of this icon on the VMS it is strongly recommended to clearly precise the type of vehicles concerned by the ban.

**CL&FR3:** A single icon is not enough for a clear understanding of the measure from HGV drivers. With an additional panel type **H,1** of the Vienna Convention, VMS must precise the tonnage of HGV concerned (without tonnage precision the ban applies for HGV > 7.5t)

![H,1 panel](image)

**Figure 10: H,1 panel**
Example of overtaking ban for HGV > 12 tonnes:

![Figure 11: HGV Ban panel for 12t](image)

When buses, caravans or vehicles with trailers are concerned by the ban measure the additional panel type H,5 of the Vienna Convention should be used. However dedicated icons for buses, caravans or trailers need to be studied with ESG4 “Mare Nostrum”.

![Figure 12: HS panel](image)

**2.5.2.2 End of the ban VMS**

**CL&FR4:** the end of the ban section must be signalled, when this end is provided with VMS, they must respect the Vienna Convention by using the XC17 d panel:

![Figure 13: XC17 d panel](image)
2.5.3 Location of the signalisation

On the motorway section

**CL&FR5** In order to keep in mind the drivers with the dynamic ban when driving VMS should be installed with a 10 km maximal distance.

![Figure 14: VMS Configuration A](image1)

At the motorway entrance

**CL&FR6**: For the dynamic overtaking ban, a VMS must be installed on the motorway section just after the entrance.

**CL&FR7**: Additional dynamic information using VMS may also be installed on the motorway access

![Figure 15: VMS Configuration B](image2)
At the exit of rest and service areas

Users stopped on rest and services areas must be informed when restarting their trip. A ban activation could occur while drivers are taking a rest and they need to be informed when leaving service areas.

**CL&FR8:** a VMS **must** be installed on the motorway section after the exit (in order to minimise the number of VMS to install the localisation of this VMS can be combined with the requirement of 10km distance between 2 VMS on the motorway section).

**CL&FR9:** Additional dynamic information using VMS **may** also be installed at the exit of the rest and service areas.

![Figure 16: VMS Configuration C](image_url)
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

Depending on the operational environment and the local context, the HGV overtaking ban service can be deployed according to 3 levels of service. These levels are defined as such:

<table>
<thead>
<tr>
<th>ELEMENT OF HGV OVERTAKING BAN</th>
<th>LEVEL OF SERVICE</th>
<th>LEVEL OF SERVICE</th>
<th>LEVEL OF SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitoring</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Manual through traffic officers and/or police</td>
<td>Semi automatic via traffic officers and/or police and loops</td>
<td>Automatic through loops, sensors and/or cameras</td>
</tr>
<tr>
<td>Overtaking area signing (permanent or intermittent service)</td>
<td>Fixed</td>
<td>Prism or VMS (Dynamic service)</td>
<td>VMS (Dynamic service)</td>
</tr>
<tr>
<td>Activation and de-activation (decision and action)</td>
<td>Manual</td>
<td>Manual and remote controlled</td>
<td>Manual, based on decision support systems and remote controlled</td>
</tr>
</tbody>
</table>

Table 4: LoS table
## 2.6.3 Level of Service Criteria related to Operating Environment

**LoSR1:** according OE where the service is installed minimum and maximum LoS criteria **must** be respected

### ELEMENT OF HGV OVERTAKING BAN

<table>
<thead>
<tr>
<th>Criteria for the Levels of Service</th>
<th>C1</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
<th>R7</th>
<th>R8</th>
<th>S1</th>
<th>S2</th>
<th>N1</th>
<th>N2</th>
<th>P1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation and de-activation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Manual, based on decision support systems and remote controlled</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Service non applicable</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Overtaking area signing</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. VMS (dynamic service)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>1. Fixed (permanent or intermittent service)</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
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<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Service non applicable</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Automatic via cameras, loops, sensors</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2. Semi-automatic via traffic officers and/or police and loops</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>1. Manual via traffic officers and/or police</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Service non applicable</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

### EasyWay OPERATING ENVIRONMENT

- **C1:** Manual, based on decision support systems and remote controlled
- **T1:** Manual and remote controlled
- **T2:** Manual, based on decision support systems and remote controlled
- **T3:** Manual and remote controlled
- **T4:** Manual, based on decision support systems and remote controlled
- **R1:** Manual and remote controlled
- **R2:** Manual and remote controlled
- **R3:** Manual and remote controlled
- **R4:** Manual and remote controlled
- **R5:** Manual and remote controlled
- **R6:** Manual and remote controlled
- **R7:** Manual and remote controlled
- **R8:** Manual and remote controlled
- **S1:** Manual and remote controlled
- **S2:** Manual and remote controlled
- **N1:** Manual and remote controlled
- **N2:** Manual and remote controlled
- **P1:** Manual and remote controlled

### Recommendations for LoS per OE:

- **M:** Minimum LoS recommended
- **O:** Optimum LoS recommended
- **OM:** Minimum = Optimum
- **NA:** Non applicable

Table 5: Level of Service to Operating Environment
3 PartB: Supplementary Information

3.1 State-of-the-art of evaluation

Several experiments and evaluations have been conducted on HGV overtaking ban deployments. The following tables underlines the main results of evaluations conducted in Europe. These experimentations help to identify the pro and cons of the service from road users’ and from traffic managers’ perspectives.

### Synthesis of main impacts:

<table>
<thead>
<tr>
<th>IMPACTS OF THE HGV BAN OVERTAKING</th>
<th>Positive effects</th>
<th>Negative effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consequences on traffic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General observations</td>
<td>Better flow</td>
<td>Speed of all heavy vehicles adjusted to that of the slowest</td>
</tr>
<tr>
<td>Flowing traffic</td>
<td>Speed homogeneity on each lane</td>
<td></td>
</tr>
<tr>
<td>(flow&lt;2000 veh/hr one way, on both lanes)</td>
<td>Average speed increased on both lanes</td>
<td></td>
</tr>
<tr>
<td>Dense traffic flow</td>
<td>Speed of private vehicles</td>
<td>Speed of lorries</td>
</tr>
<tr>
<td>(flow&gt;2000 veh/hr one way, on both lanes)</td>
<td>Speed of private vehicles</td>
<td>Reduced in case of dense traffic flow</td>
</tr>
<tr>
<td>% of lorries on fast lane</td>
<td>decrease to reach approximately 2%</td>
<td>Progress margin (2% of lorries use the fast lane despite the interdiction)</td>
</tr>
<tr>
<td>Compliance with the interdiction</td>
<td>Good compliance in general</td>
<td>Less compliance in case of increase in the % of lorries in the traffic</td>
</tr>
<tr>
<td>Distance between vehicles</td>
<td></td>
<td>Tends to diminish for lorries</td>
</tr>
<tr>
<td>Reception from users</td>
<td>Measure seen as beneficial by private vehicle drivers</td>
<td>Measure sometimes seen as penalizing by lorry drivers</td>
</tr>
<tr>
<td>Safety</td>
<td>Safety improved on sections where accidents related to lorry traffic have occurred</td>
<td>Appearance of queues or “lorry walls” on the right lane which impede the entry/exit of vehicles</td>
</tr>
<tr>
<td>Environment</td>
<td>Reduction of traffic on regulated sections</td>
<td>“Elephant race”; out of regulated areas, lorries start overtaking again</td>
</tr>
<tr>
<td></td>
<td>Reduction of CO\textsuperscript{2} emission when measured</td>
<td></td>
</tr>
</tbody>
</table>
Synthesis of evaluation conducted on main experimentations:

<table>
<thead>
<tr>
<th>Evaluation main results</th>
<th>France</th>
<th>Netherlands</th>
<th>Germany</th>
<th>Denmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4</td>
<td>RN83</td>
<td>A7</td>
<td>A2</td>
<td>15% of the motorway network</td>
</tr>
<tr>
<td>Type of interdiction</td>
<td>Permanent</td>
<td>Intermittent</td>
<td>Dynamic</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X (7 AM – 7 PM)</td>
<td>X (6 AM – 10 PM)</td>
<td>X (6 AM – 6 PM)</td>
<td></td>
</tr>
<tr>
<td>Weight threshold</td>
<td>&gt; 3.5 T</td>
<td>&gt; 19 T</td>
<td>&gt; 12 T</td>
<td>&gt; 12 T</td>
</tr>
<tr>
<td></td>
<td>&gt; 7.5 T</td>
<td>?</td>
<td>&gt; 3.5 T</td>
<td></td>
</tr>
<tr>
<td>Accrued length</td>
<td>7 km</td>
<td>20 km</td>
<td>150 km</td>
<td>90 km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>75 km</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100 km</td>
</tr>
<tr>
<td>Traffic data (each way)</td>
<td>AADT: 25000 veh/day and lorries:13% of traffic</td>
<td>AADT: 32000 veh/day and lorries:14% of traffic</td>
<td>AADT: 75000 veh/day and lorries:20% of traffic</td>
<td>From 2600 veh/hr and number of lorries included in predefined limits (upper and lower)</td>
</tr>
<tr>
<td></td>
<td>AADT: 12500 veh/day and lorries:32% of traffic</td>
<td>From 3200 veh/hr and lorries:25% of traffic</td>
<td></td>
<td>AADT &gt; 20000 veh/day and lorries:70% of traffic</td>
</tr>
<tr>
<td>Consequences on traffic</td>
<td>No noticeable impact</td>
<td>Traffic is perceived as better flowing</td>
<td>Improved traffic flow</td>
<td>More fluidly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Traffic is perceived as better flowing</td>
<td>More easy-paced and homogeneous</td>
<td>Overall improvement</td>
</tr>
<tr>
<td>Speed</td>
<td>Noticeable increase on both lanes in flowing traffic</td>
<td>Speed is (wrongly?) perceived as excessive on the fast lane</td>
<td>Speed of lorries decreases</td>
<td>9% increase of traffic average speed during peak period</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Speed of private vehicles increases</td>
<td>Speed of lorries weakly decreases</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Speed of private vehicles weakly increases</td>
</tr>
<tr>
<td>% of lorries on fast lane &amp; compliance with interdiction</td>
<td>Important decrease when % of lorries on fast lane &gt; 5%</td>
<td>Decrease of 4.5 points in 2 years (7% to 2.5%)</td>
<td>High compliance rate</td>
<td>No significant decrease</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Decrease (no other data)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Decrease is reduced when lorry traffic is dense (lorries&lt;15% of traffic)</td>
</tr>
<tr>
<td>Distance between vehicles</td>
<td>Few variations</td>
<td>Sometimes difficult to enter the right lane</td>
<td>Increase of no-compliance by lorries; Slow increase by private vehicles</td>
<td>Very weak decrease of distances between lorries</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very weak decrease of distances between lorries</td>
</tr>
<tr>
<td>User satisfaction</td>
<td>Lorry drivers find it useful in difficult weather conditions</td>
<td>Seen as beneficial by private vehicle drivers</td>
<td>Not validated by lorry drivers but accepted if justified. Unuse related to the transport of dangerous goods(interior maximum speed)</td>
<td>Very well accepted by user. The dynamic aspect of the interdiction is appreciated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>“theoretical” satisfaction of users when flow &gt; 2000 veh/hr each way</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Seen as useful by most users</td>
</tr>
<tr>
<td>Safety</td>
<td>no data</td>
<td>Feelings of insecurity due to the appearance of lorry walls</td>
<td>Appearance of lorry walls</td>
<td>33% decrease of incidents</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No significant change</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Efficient in case of high lorry accidents rate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Situations more prone to accidents when exiting “interdiction sections” because of overtakes. Appearance; of lorry walls</td>
</tr>
<tr>
<td>Environment</td>
<td>no data</td>
<td>no data</td>
<td>no data</td>
<td>- 500 tonnes of CO²</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>no data</td>
</tr>
</tbody>
</table>

Colour codes:  
- **positive**  
- **negative**  
- **neutral**
3.2 Current Best Practices

3.2.1 French experiences

3.2.1.1 Poitiers – Spanish Border corridor

An incessant increase of HGV traffic is recorded for several years, with a high level of difficulties (high speed level, important number of overtaking, no respect of inter-vehicle distances).

A first experimental HGV overtaking ban was conducted on several sections of this corridor early 2003 and today the measure is included on large part of the Poitiers – Spanish Border corridor. Sections where the service is applied have been chosen according to their main characteristics (traffic conditions, accidents, ...).

The figure shows the areas where the ban is applied (red area), HGV overtaking possibilities (green area).

Evaluation of this experimentation was conducted through:

- Traffic condition comparison (before/after) with traffic station
- Dedicated surveys concerning number of HGV overtaking

Results of HGV drivers surveys show:

They are not really in favour of the measure but they accept it mainly when level of traffic is important. They agree the measure provides good results concerning light vehicle fluidity.

3.2.1.2 A7 ASF Motorway in the Rhone valley

Another major experience was conducted in France on the A7 motorway network, this motorway is one of the busiest interurban roads in Europe with a 3-lane configuration carrying (2007 data):

- 75,000 veh/day (AADT)
- 115,000 veh/day (ASDT)
- 175,000 veh/day in peak-periods
main objectives of this experience was to:

- decrease the loss of capacity due to trucks and caravans overtaking in heavy traffic sections
- Improve safety in accident black spots

the vehicles concerned were trucks (heavier than 12 tons) and caravans

Evaluation allowed to confirm the signage was efficient:

- 94% of customers (96% of trucks drivers) were aware of the measure through the signs,
- 98% of customers (99% of trucks drivers) understood that the ban on overtaking applied to trucks and 87% to caravans,

The measure was well accepted:

- 80% of LV customers considered it improves safety, traffic conditions and driving comfort,
- 50% of truck customers found it useful
- High compliance rate: 50% of long vehicles driving on the middle lane moved to the right lane
- Increase of environmental quality with a reduction of polluting emissions (-500 tons of CO2) due to the congestion drop (-7%)
- Improvement of safety: 33% decrease of incidents and a higher driving comfort due to the congestion decrease
- More fluidity: 9% increase of traffic average speed in peak-periods
- No incidents due to the measure
3.2.2 Dutch experiences

Netherlands is one of the pioneers for the HGV overtaking ban experimentation and deployment in Europe. Today the HGV overtaking ban is applied on more than 50% of the motorway network in this country.

The first experiences started in 1997 on a 2x2 lane motorway network (185 km) by intermittent ban during daily peak period traffic.

The measure was extended in 1999 on additional 750 km motorway network and in 2002 and 2003 (400km).

Since 2005 two main dynamical HGV overtaking bans were conducted on 2 sections of the A2 motorway: the first experimentation on a 2x2 lane near Limburg, the second on a 2x3 lane near Utrecht. The threshold for the activation and deactivation of the measure depend on the traffic flow and the % of HGV on the network:

<table>
<thead>
<tr>
<th>Profile characteristics</th>
<th>2x2 lane near Limburg</th>
<th>2x3 lane near Utrecht</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity (veh/h per direction)</td>
<td>4600</td>
<td>6700</td>
</tr>
<tr>
<td>Activation</td>
<td>Total flow</td>
<td>2600</td>
</tr>
<tr>
<td></td>
<td>HGV flow</td>
<td>250 (9.6% of total flow)</td>
</tr>
<tr>
<td>Deactivation</td>
<td>Total flow</td>
<td>2300</td>
</tr>
<tr>
<td></td>
<td>HGV flow</td>
<td>230 (10% of total flow)</td>
</tr>
</tbody>
</table>

Evaluation of these experimentations was conducted through:

- Traffic condition comparison (before/after) with traffic station
- Dedicated surveys HGV and LV drivers
- Video analysis

Main results of the experimentations are listed hereafter:

- Ban activation time: the systems are 3 or 4 times daily activated (during working days) and sometimes during week end period
- Ban respect: the ban respect rate is quite important (98%)
• Average speed: speed homogenisation recorded on the different lanes
• Inter-vehicle time: a slight reduction of inter-vehicle time
• Accident: no major change

Users acceptance:
• 80% of LV drivers and 70% of HGV drivers are satisfied with the dynamic ban
• 90% of HGV drivers prefer the dynamic ban rather than the static one’s
• drivers feel a better traffic fluidity on the network

Experience gained in the Netherlands show the interest of the dynamic ban in place of the static one’s. Thanks to an activation during appropriate period the ban is well better accepted by the users (LV and HGV drivers)

3.2.3 German experience

Due to a constant traffic increase and in order to find solution to solve the congestion problems Germany experimented this traffic management measures since 1990. Today HGV overtaking ban is deployed on 750 km in Bavaria as well as on the Baden-Württemberg network.

The German institute Bundesanstalt für Stassenwesen (BAST) conducted research to determine the appropriate threshold to optimise the measure activation in case of dynamic application. The following table present the main results according to the road profile:

<table>
<thead>
<tr>
<th>Profile characteristic</th>
<th>2x2 lane</th>
<th>2x3 lane</th>
<th>2x4 lane</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total flow (per direction)</td>
<td>3200</td>
<td>4000</td>
<td>4400</td>
</tr>
<tr>
<td>HGV %</td>
<td>25</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Deactivation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total flow (per direction)</td>
<td>2900</td>
<td>3600</td>
<td>3900</td>
</tr>
<tr>
<td>HGV %</td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

A dedicated evaluation was conducted on 75 km on the 2x2 lanes motorway (12 sections) in the West and South parts of the German network. The evaluation dealt with:

• Traffic condition comparison (before/after) with traffic station
• Accident analysis on the ban section but also on the sections located each part of the ban section
• An economic evaluation

Main conclusions of these evaluations are:

• An increase of LV speed
• A decrease of HGV speed
• A slight reduction of inter-vehicle distance
• An increase of occupancy rate on the right lane
• A good respect of the ban (national and foreign drivers)
• Incidence of the slope regarding the measure’s effectiveness

The following figure presents the results of the social economic evaluation of the HGV overtaking ban according to the HGV % and traffic conditions on the section.

Results of this economical evaluation show that the measure is mainly useful for 2x2 lane sections over 2000veh/h traffic per direction.

3.2.4 Danish experiences

The first experimentations started between 2001 and 2003 on an a huge part of the national motorway 2x2 lane network: 11 sections corresponding to 15% of the motorway network (100km) during working days (Monday to Friday from 6:00 am to 6:00 pm), ban concerned HGV, bus >3.5 t., all vehicles with trailer and caravans.

A second experimentation, based on the German experiences, was conducted in 2005 with the following criteria: 10km. maximal section length, flow> 20000 veh/h per direction, HGV rate > 10%
Evaluation conducted for these experimentation mainly shows:

- trucks drivers respected the measure (no more than 2% on the left lane)
- users were well aware about the measure implementation
- users consider the measure improves the safety conditions
- No incidents detected due to the measure
- After the ban sections an increase of truck overtaking (elephant race phenomena)
- Some difficulties for the entry and exit

3.2.5 British experiences

The Highway Agency is conducting an experimentation on a 3 miles section around Birmingham, on the north part of the M42 between 10 and 11 junctions where the traffic is high (29 000 veh/day and 23% HGV rate).

Main objective of this experimentation is to reduce the congestion due to the high percentage of slow vehicles on this slope section. Before experimentation a lot of LV drivers signalled difficulties dealing with unsafe conditions, congestions and uncomfortable situations.

Experimentation was conducted between 7:00 am – 7:00 pm for HGV > 7.5t. on this 5km section of the M42 for a 18 month duration from October 2005.

![Average LV time on the section](image1)

![Average HGV time on the section](image2)
The rate of HGV has been divided per 3, this proportion could be reduced with additional enforcement measures. The experimentation is still running, nevertheless it seems to have positive impacts on the detected accidents.

3.2.6 Italian experience along the A22

Between the Brenner pass and Modena (314 km) the A22 uses permanent overtaking bans detailed as follows:
- from the Brenner pass (Austrian border) to Bolzano South (about 85 km) the Autostrada del Brennero applies 24 h an overtaking ban for HGV (> 7,5 t), caravans and trailers;
- from Bolzano South to Modena (about 229 km) applies from 6 a.m. to 22 p.m. an overtaking ban for HGV (> 12 t), caravans and trailers.

Autostrada del Brennero doesn’t use dynamic overtaking bans and our permanent bans are displayed on VMS and signalled by fixed road signs as well. In both cases the tonnage of the concerned HVG is showed.
### 3.2.7 Spanish experience

#### GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Name of service/project</th>
<th>HGV vehicles overtaking ban measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of operator/organisation</td>
<td>DGT</td>
</tr>
<tr>
<td>Web link</td>
<td><a href="http://www.dgt.es">www.dgt.es</a></td>
</tr>
<tr>
<td>Contacts</td>
<td>Enrique Belda Esplugues</td>
</tr>
<tr>
<td>Other</td>
<td>Albano Arnes, Vicente R. tomás</td>
</tr>
<tr>
<td>Applicable Deployment Guideline</td>
<td>TMS DG06 HGV Overtaking Ban</td>
</tr>
</tbody>
</table>

#### GEOGRAPHICAL ASPECTS

| Country | Spain |
| Region of implementation | Spain |
| Networks concerned | All DGT road network |
| Deployment indicators | Number of kilometers |

#### SERVICE DESCRIPTION

<table>
<thead>
<tr>
<th>Problem(s) addressed / Objectives (Relation to EW objectives. Background/motivation to the ITS application - basic question: WHY)</th>
<th>Reduction of congestion</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Increase of safety</td>
<td></td>
</tr>
<tr>
<td>□ Reduction of environmental damage (%)</td>
<td></td>
</tr>
<tr>
<td>□ Other:</td>
<td></td>
</tr>
</tbody>
</table>

**ITS service description**

(Description of ITS application, example of systems used functionality and technologies used, users involved, location, context within wider ITS system, current status of the application. (maximum 50 words))

A traffic management measure for the HGV overtaking ban has been deployed. This measure is included in all traffic management plans for adverse weather situations. When the road level of service for adverse weather situation reach green level, it is forbidden for all HGV to overtake. The measure uses the TMP ITS systems, CCTV and VMS.
IMPLEMENTATION ASPECTS

Duration (start, end)
Start: 2004
End: The system is currently working in all TMP for adverse weather situations

Lessons learnt / factor of success
Technical
HGV incidents have decreased after the TMP measure deployment. Traffic flows in adverse weather situations are improved. Video Enforcement is recommended.

Institutional/organisational

Legal

Financial

Impacts assessment / results
Technical
Results are very positive. HGV incidents are decreased in the coverage area.

Institutional/organisational

Legal

Financial

Impacts assessment / results
(Description of impacts in terms of safety, travel efficiency, environmental impacts, security, traffic management...)

REFERENCES

Documentation available on the project
Title: Coordinación entre Administraciones. Respuesta ante situaciones de emergencia. Especial referencia al protocolo de nevadas
Contact: A. Arnes. aarnes@dgt.es
Language: Spanish

EW/TEMPO evaluation

ILLUSTRATIONS

GREEN LOS

Figure 1. - Image of the road network with green level of service. On the right, the signals used in

Figure 2. - Example of VMS signalization
VMS.
3.3 Business Model

3.3.1 Criteria and methods for the technical evaluation of the measure

An ante evaluation is required to define the major objectives of the service. This evaluation must be established before the implementation of the service, it requires to realize beforehand a traffic analysis which constitutes the state of the art of the current situation. This analysis allows to get the entry data for the service evaluation on the concerned section, in particular:

- Section characteristics: length, longitudinal profile, cross section, lane number, speed limit...
- Traffic characteristics: veh/h, HGV %, number of lorries..
- Accident characteristics: slight/injury/fatal accidents, HGV accident rate, period...
- Level of service: traffic jam, free flowing, travel time,
- Environmental characteristics: fuel consumption, CO² emissions....

For the post evaluation, assessment of the HGV overtaking ban’s effects can be determined through the following 4 main indicator’s family:

1) Spend time family: the time gained thanks to the service is measured by the reduction of the traffic jam (length and duration). The daily saving time is expressed in veh.h for a typical day, the global annual value is calculated depending on the number of working days
2) Safety family: it depends on the annual number of saved accidents related to the implementation of the service,
3) User’s comfort and acceptability : this measure is ensured through dedicated survey
4) Environmental family: the main indicators for this family are:
   - Emission of pollution (CO, CO², HC, NOx)
   - Fuel consumption,
   - Noise emission

Previous evaluation approaches in Germany:

- Comparison of accident development on sections without, with static and with dynamic HGV overtaking ban
- Before-After-Comparison of O-D diagrams in the concerned areas
- Comparison of speed level prior to and after installation of the HGV overtaking ban
- Analysis of HGV involvement in accidents during and outside the times of HGV overtaking ban

The evaluation has to be conducted on the ban’s section, nevertheless a complete evaluation should be studied by integrating the adjacent networks in the process’s assessment: the measure taken on the principal network can be estimated as too much constraining for the lorry’s drivers, as consequence part of these drivers could decide to use parallel or alternative roads. Such a complete evaluation require to collect quantitative data on these alternative networks too.

3.3.2 Cost / Benefit Analysis

Cost and benefit analysis result on the evaluation process (ex or post evaluation) which will allow to calculate:

Cost of the system which must integrate the following investment and operation cost components:
• Studies
• Monitoring equipments
• System for strategy implementation
• System and equipments for user and partners information
• Data storage and transfer
• Maintenance and upgrade
• Staff
• Communication actions including engagement with HGV operators
• Evaluation studies
• Enforcement

Benefits components are:
• Safety
• Travel time
• Environment
• Comfort

The various experimentations presented in this document have already estimated some results concerning the cost benefit of the service deployment.
Nevertheless it seems necessary to harmonise the methods used for the benefit cost calculation to effectively compare the different experimentations and deployments in Europe.
## 4 Annex A: Compliance Checklist

### 4.1 Compliance checklist "must"

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Fulfilled?</th>
<th>If no – quote of insurmountable reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Functional requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR1 HGV Overtaking ban service implementation <strong>must</strong> be carried out following the functional decomposition according to seven sub functions:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR2 Data collection system <strong>must</strong> be able to detect in real time vehicle flow, speed and HGV%.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Organisational requirements:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR1 The organisational and operational structure of the service as well as the role of each organisation/body and its tasks <strong>must</strong> be defined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR2 Road operators <strong>must</strong> be able to provide the dynamic HGV overtaking ban information available in real time by a relevant interface providing real DATEX II publications.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OR3 Services operators <strong>must</strong> be able to integrate the DATEX II publications provided by the road operators when they publish the ban information measure.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Technical requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR1 The data collection system <strong>must</strong> be able to detect in real time the following parameters: vehicle flow, speed and HGV%.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR2 The data collection system <strong>must</strong> be installed:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• before the ban (at least one counting point)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• along the ban (at least one counting point between each entry / exit of the motorway network)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR4 The use of VMS <strong>must</strong> respect the recommended signs of the Vienna Convention for use on VMS, Annex IX of</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The overtaking ban **must** be described in the DATEX II profiles:

| TR5 | The overtaking ban **must** be described in the DATEX II profiles: |

**Required Common Look & Feel**

| CL&FR2 | The dynamic HGV overtaking ban **must** require the use of VMS display. The icon is the C, 13ba panel, recommended by the Vienna Convention: |
| CL&FR3 | VMS **must** precise the tonnage of HGV concerned (without tonnage precision the ban applies for HGV > 7.5t) |
| CL&FR4 | the end of the ban section **must** be signalled, when this end is provided with VMS, they **must** respect the Vienna Convention |
| CL&FR6 | For the dynamic overtaking ban, a VMS **must** be installed on the motorway section just after the entrance. |
| CL&FR8 | a VMS **must** be installed on the motorway section after the exit (in order to minimise the number of VMS to install the localisation of this VMS can be combined with the requirement of 10km distance between 2 VMS on the motorway section). |

**Required LoS related to OE**

| LoSR1 | According OE where the service is installed minimum and maximum LoS criteria **must** be respected. |

### 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>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Functional requirements</td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organisational requirements</td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td>technical requirements:</td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Common Look &amp; Feel</td>
<td>CL&amp;FR5</td>
<td>In order to keep in mind the drivers with the dynamic ban when driving VMS</td>
<td></td>
</tr>
</tbody>
</table>
**Level of service criteria**
none

### 4.3 Compliance checklist "may"

<table>
<thead>
<tr>
<th>#</th>
<th>Requirement</th>
<th>Fulfilled?</th>
<th>If yes – remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Functional requirements</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td></td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organisational requirements</td>
<td>none</td>
<td></td>
</tr>
<tr>
<td></td>
<td>none</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Technical requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TR3</td>
<td>After the ban area a station to collect journey time information for the evaluation purposes <em>may</em> be implemented.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Required Common Look &amp; Feel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL&amp;FR1</td>
<td>A wide area deployment of this service <em>may</em> limit the length for the ban to 20 km on a section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL&amp;FR7</td>
<td>Additional dynamic information using VMS <em>may</em> also be installed on the motorway access</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL&amp;FR9</td>
<td>Additional dynamic information using VMS <em>may</em> also be installed at the exit of the rest and service areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Level of service criteria</td>
<td>none</td>
<td></td>
</tr>
</tbody>
</table>
5 Annex B: Bibliography


