Harmonising European ITS Services

Freight & Logistics Services

INTELLIGENT AND SECURE TRUCK PARKING

Deployment Guideline

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The Deployment Guidelines have been developed in EasyWay, EIP and EIP+
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Support

Further information	dg.its-platform.eu	Questions/help	dg.its-platform.eu/user-support

Preface (2016)

After the EasyWay project ended in 2012, the Deployment Guidelines have been updated by the EIP / EIP+ projects. They focussed on updating Best Practice and did neither have the capacity nor the intention for a full revision of the text, since especially the Member State adoption of the guidelines' requirements form a huge asset of European harmonisation. In the light of recent European Delegated Regulations, the EU EIP platform will now consider a full revision of the format and the content of the whole set of Deployment Guidelines.

Preamble (2012)

EasyWay is a cooperation of road authorities and road operators from 27 European countries that have teamed up to unlock the benefits of cooperation and harmonisation in the deployment of Intelligent Transport Systems (ITS) on Europe's major road network. ITS as a technology is a known contributor to sustainable mobility in terms of improved safety, efficiency and reduced environmental impact. Nevertheless, fragmented deployment on a national level will fail to deliver seamless European services and will not contribute to a coherent European Transport network. The European Member States have consequently launched the EasyWay project together with the European Commission as a platform to harmonise their ITS deployments.

This document has been drafted by EasyWay as part of the set of documents containing the 2012 version of the EasyWay Deployment Guidelines (DG 2012). These guidelines have been developed by EasyWay experts and practitioners. They have undergone a thorough review by international domain experts in an intense peer review exercise and they have been validated by the participating Member State Partners of EasyWay in an extensive formal Member State consultation process, which finally led to their adoption as basis for all deployment activities in future EasyWay phases.

EasyWay as a project is not a standardisation body, nor does it have any power to legally constrain the Member State in their national deployment activities. It is therefore crucial to understand that these documents are neither technical standards, nor are they specifications as they would be required for such cases, e.g. as currently developed by the European Commission as their part of the implementation of the ITS Directive 2010/40/EU. But since a certain level of strictness in compliance is required to achieve the intended goal of the EasyWay Deployment Guidelines – harmonisation and interoperability in Europe – the guideline documents are written in a way that clearly defines criteria that deployments have to fulfil in order to claim overall compliance with the guideline.

Although not legally binding in any sense, compliance may be required for the eligibility of deployments in future ITS road projects co-funded by the European Commission. Deviation from compliance requirements may nevertheless be unavoidable in some cases and well justified. It is therefore expected that compliance statements may contain an explanation that justifies deviation in such cases. This is known as the "comply or explain" principle.

Although not standards themselves, the EasyWay DG2012 Deployment Guidelines in some cases do mention – and sometimes require – the use of such standards. This is the case in particular regarding the use of the CEN/TS 16157 series of technical specifications for data exchange ("DATEX II"). Although standardised data exchange interfaces are a powerful tool towards harmonised services in Europe, it must be understood that real world deployments have to fit into existing – and sometimes extensive – infrastructures and investment in these infrastructures must be protected. It is therefore important to note that the use of DATEX II mentioned below as a MUST is referred to implementation of "new" data exchange systems and not the utilisation of the existing ones, unless these latter affect harmonisation of deployments or interoperability of services.

Service at a glance

SERVICE DEFINITION

Two different services with regard to intelligent truck parking are considered:

- Information and guidance (on truck parking areas)
- Reservation (of truck parking spaces)

Production and distribution of static and dynamic information on the truck parking situation on the TEN-T networks and access roads to manage the parking space, support the observation of rest and driving periods for drivers, reduce dangerous parking and improve drivers, load and goods vehicle safety and security. This information could be provided on-trip and pre-trip using different information channels and different end-user devices.

Beyond that the service can be combined with the individual reservation of a truck parking space with the help of telematics services via different devices. A parking space on site is reserved (blocked) and kept free for the pre-identified goods vehicle.

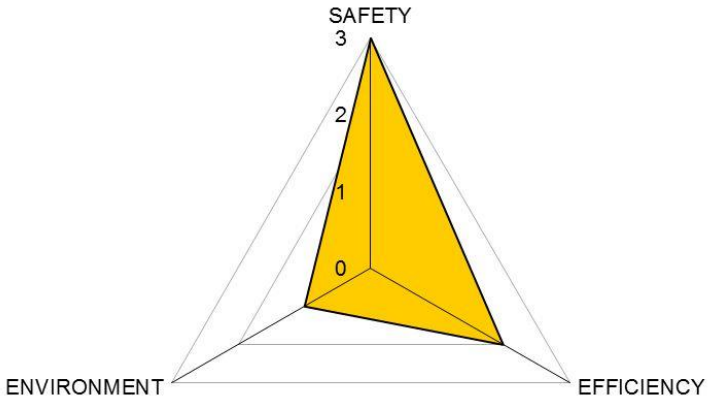
SERVICE OBJECTIVE

The main objective of providing information to the end user is improving the safety and the efficiency of the parking areas and the safety and security of truck drivers.

ITP is useful in sections where demand and capacity is nearly balanced but has many rest areas. The drivers need information which of the available rest area provides free parking spaces. ITP then reduce construction of new rest areas or parking lots on existing rest areas.

If the truck drivers know the upcoming parking situation in advance they would be prepared and could pro-actively change their route or park earlier. Parking information can be factored into both pre- and on-trip journey planning. This may change the parking times, assist the truck driver to take more effective routing decisions. Better-informed truck drivers find a safe and secure parking place more easily, sleep well and hence benefit from improved concentration.

SERVICE BENEFIT RADAR



EUROPEAN DIMENSION
The measure concerns priority areas identified in the EU ITS Directive (2010/40/EU): • Optimum use of road, traffic and travel data • Continuity of traffic and freight management ITS services • ITS road safety and security applications, • Linking the vehicle to the infrastructure Due to heterogeneity, technical aspects such as “what is a parking lot” or detection methods aren’t a harmonisation purpose.

Table of Content

1 Introduction 8
1.1 The concept of the EasyWay Deployment Guidelines 8
1.1.1 Preliminary note 8
1.1.2 Applying Deployment Guidelines – the “comply or explain” principle 8
1.1.3 Use of Language in Part A 8
1.2 ITS-Service Profile 10
1.2.1 ITS-Service Strategy 10
1.2.2 Contribution to EasyWay Objectives 11
1.2.3 Current status of deployment 12
1.2.4 European Dimension 13
2 Part A: Harmonization Requirements 14
2.1 Service Definition 14
2.2 Functional Requirements 14
2.2.1 Functional architecture 14
2.2.2 Functional decomposition and interfaces 14
2.2.3 Advice for functional requirements 16
2.3 Organisational Requirements 18
2.4 Technical Requirements 18
2.5 Common Look & Feel 19
2.6 Level of Service Definition 20
2.6.1 Preliminary remark 20
2.6.2 Level of Service Criteria 20
2.6.3 Level of Service Criteria related to Operating Environment 21
3 Part B: Supplementary Information 23
3.1 Best Practice 23
3.1.1 Examples of deployment 23
3.1.2 EIP/EIP+ user and application survey 2013 - 2015 42
3.2 Business Model 47
3.2.1 Stakeholders in Service Provision 47
3.2.2 Cost / Benefit Analysis 47
3.2.3 Vision for the future 47
4 Annex A: Compliance Checklist 49
4.1 Compliance checklist "**must**" 49
4.2 Compliance checklist "**should**" 51
4.3 Compliance checklist "**may**" 53

List of figures and tables

Figure 1: Service radar “Intelligent and secure truck parking” 11
Figure 2 Functional architecture of the information service 14
Figure 3: pilot area around Vienna 24
Figure 4: CCTV pictures 24
Figure 5: VMS in Austria 25
Figure 6: VMS in France 25
Figure 7: Example A7 Motorway 26
Figure 8: Autoparco Brescia-Est 28
Figure 9: Guarded Entrance 28
Figure 10: Pay machine 28
Figure 11: 3D picture of the TPA 29
Figure 12: VMS 30
Figure 13: monitoring system 30
Figure 14: Tasks of the Mobility Data Marketplace 31
Figure 15: Functions of the Mobility Data Marketplace 32
Figure 16: Parking situation for HGV on the TERN in night hours in Germany 33
Figure 17: ANIA: website GEOSOSTA 34
Figure 18: RLP: real-time information provision 34
Figure 19: VMS with currently available parking lots 35
Figure 20: Example Montabaur: optimised organisation of the parking area 35
Figure 21: Occupancy dissemination on parking areas in a section 36
Figure 22: SETPOS internet information platform 36
Figure 23: SETPOS reservation facility 37
Figure 24: Fence and CCTV 39
Figure 25: Gate 39

Table 1: Part A - requirement wording 9
Table 2: Level of Service criteria 20

List of abbreviations

ASF	Autoroutes du Sud de la France
CENTRICO	Central European Region Transport Telematics Implementation Coordination Project
ESG	European Study Group
EU	European Union
HGV	Heavy Goods Vehicles
ICT	Information and Communication Technology
IRU	International Road Transport Union
ITP	Intelligent Truck Parking
ITS	Intelligent Transport Systems
LABEL	Creating a Label for (Secured) Truck Parking Areas
LOS	Level of Service
OBE	On-Board Equipment
OE	Operating Environments
RDS-TMC	Radio-Data-System / Traffic-Message-Channel
ROI	Return on Investment
SAPN	Société des Autoroutes Paris-Normandie
SETPOS	Secured European Truck Parking Operational Services
TCC	Traffic Control Center
TCP	Telematics-Controlled Parking
TEN-T	Trans-European Network for Transport
TERN	Trans-European Road Network
TIS	Traveller Information Services
TPA	Truck Parking Area
VMS	Variable Message Sign(s)
FR<#>	Functional requirement <number>
OR<#>	Organisational requirement <number>
TR<#>	Technical requirement <number>
CL&FR<#>	Look and feel requirement <number>
LoSR<#>	Level of service requirement <number>

1 Introduction

1.1 The concept of the EasyWay Deployment Guidelines

1.1.1 Preliminary note

This document is one of a set of documents for the EasyWay project, a project for Europe-wide ITS deployment on main TERN corridors undertaken 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 European ITS 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 started in 2007 and has since established a huge body of knowledge and a consensus for the harmonised deployment of these ITS services. This knowledge has been captured in documents providing guidance on service deployment - the EasyWay Deployment Guidelines.

The first iteration of the Deployment Guidelines mainly captured best practice. This strongly supported service deployment within EasyWay by:

- making EasyWay partners in deployment aware of experiences made in other European deployment programmes.
- helping to avoid making errors others had already made
- reducing risk and facilitating efficient deployment by highlighting important and critical issues to consider

Meanwhile, this best practice has already successfully contributed to ITS deployments across Europe. It is now possible to take the logical next step and actually start 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. Apart from 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 are 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 within the scope of EasyWay. Thus, the content of this section is prescriptive by nature. EasyWay partners are expected to ensure that their deployments are compliant with the specifications in this section. Wherever concrete circumstances in a project do not allow these recommendations to be followed fully, EasyWay partners are expected to provide a substantial explanation for the need 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. Supplementary information may be contained including – but 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 essential for every prescriptive document to provide specifications in a well-defined and unambiguous language. There are various definitions that clarify the use of particular words (such as those listed below) within their 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 of the keywords, their meaning and the possible answers in the context of part A provides the following table. In general the keywords in brackets are possible, but their use is not recommended in order to avoid confusion which may arise as a consequence of different common linguistic usage of the terms in the different EU member states.

Requirement wording	Meaning in RFC 2119	Meaning in EasyWay	Possible checklist answers
MUST (REQUIRED, SHALL)	the definition is an absolute requirement	there may exist insurmountable reasons to not fulfill (e.g. legal regulations…)	**fulfilled: yes** **or** **Fulfilled: no - explanation of insurmountable reasons**
MUST NOT (SHALL NOT)	the definition is an absolute prohibition		
SHOULD (RECOMMENDED)	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.	The Definition is very close to a "MUST", "MUST NOT" Meaning in EasyWay conform to RFC 2119	**fulfilled: yes** **or** **Fulfilled: no - with explanation**
SHOULD NOT (NOT RECOMMENDED)	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		
MAY (OPTIONAL)	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	Meaning in EasyWay conform to RFC 2119	**fulfilled: yes - with explanation** **or** **Fulfilled: no**

Table 1: Part A - requirement wording

Note: the capitalisation of these keywords that is frequently used in IT 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:

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.

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:

Organisational advice:

- 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 accepted of all involved parties/partners in form of a Common partner arrangement/MoU - Memorandum of understanding, which establishes the details of co-operation.

1.2 ITS-Service Profile

1.2.1 ITS-Service Strategy

1.2.1.1 General Service Description

The objective of parking area operators is to make the optimum use of the existing truck parking capacities along the highways and to improve safety and security on their (truck) parking area. “Intelligent Truck Parking” will contribute towards optimising the use of available parking areas, which are a limited resource in many corridors today. The service will also enable efficient management of roads and parking areas which may become congested or overloaded with goods vehicles at certain times due to traffic/driving restrictions, weather or road conditions.

On-site guidance allows the goods vehicles to park without spending a long time looking for a place.

End users may receive all of the information they require to park their goods vehicles through various information channels, if necessary across borders. Access to properly equipped parking and rest areas will reduce the risk for driving on “overtime”, will reduce driver fatigue, improve cargo security, and solve other problems relating to excessive driving periods and “wild” overnight parking. This in turn will reduce the sanitary, safety and security problems affecting truck drivers.

The specific needs of individual operators need to be borne in mind, such as those carrying dangerous goods or abnormal loads.

Reservation services support the individual reservation of a truck parking space with the help of telematics services on board of the goods vehicle via internet, call-centre and smartphone app. The parking space on site is reserved (blocked) and kept free for the identified goods vehicle.

1.2.1.2 What is the Vision?

The main objective of providing information to the end user is improving the safety and the efficiency of the parking areas and the safety and security of truck drivers.

ITP is useful in sections where demand and capacity is nearly balanced but has many rest areas. The drivers need information which of the available rest area provides free parking spaces. ITP then reduce construction of new rest areas or parking lots on existing rest areas.

If the truck drivers know the parking situation ahead in advance they will be prepared and can pro-actively change their route or park earlier. Parking information can be factored into both pre- and on-trip journey planning. This may change parking times and assist the truck driver to take more effective routing decisions. Better-informed truck drivers find a safe and secure parking place more easily, sleep well and hence benefit from improved concentration.

1.2.1.3 What is the Mission?

ITP for truck parking areas:

- is to inform the truck driver about static and, where necessary, dynamic information relating to truck parking areas in order to support drivers in locating parking areas and/or free parking lots
- is only required where is a lack of capacity

Reservation for truck parking lots:

- is to reserve a parking space by time.

This information could be provided on-trip and pre-trip using different channels of information and different end-user devices. The service may comprise common information as well as personalised (individual) information.

Problems to consider:

- insufficient detection methods

- easy information access for the road user is unavailable
- diversity of information portals with different presentations
- incompleteness of information
- diverging interpretation of or disregard for the information by the road user

The implementation of an ITP system has to be considered globally regarding the context of the area and the level of saturation in the areas. In some countries or regions, building new parking spaces or new parking areas is more economic than investing in ITS solutions for truck parking management. The main problem is in the detection of the occupancy of the areas. Equipping a truck area with an ITP system costs a lot of money. Road or area operators are not ready to spend this money because the ROI generated by this investment is very low - parking is free for the drivers in a lot of countries. Moreover, free truck parking doesn't encourage other stakeholders (e.g. logistics platforms, or certain hauliers) to invest in truck parking areas. Motorway truck parking areas on the motorways are sometimes considered as logistics storage.

1.2.1.4 EasyWay harmonization focus

- Pan-European understanding of the functionality and the benefit of ITP and its services
- Common look & feel for the truck driver
- interface between private and public truck parking operators and national, regional or local broadcasters

1.2.1.5 Distinctiveness from other ITS-services

Relevant complementary information is covered by another Deployment Guideline:

- Co-Modal Traveller Information Services (TIS-DG07)

This service is directed to the road user and may include general information as well as personalised (individual) information. The information provision should be in accordance with any management plans (TMP, see TMS-DG07), which are in operation by the specific road authorities or traffic management centres.

1.2.2 Contribution to EasyWay Objectives

1.2.2.1 Service radar

The graph below provides a quantification of the added value of services regarding the three main objectives of EasyWay which are: safety, efficiency and environment. The applied scale for the service radar is based on expert view and not on specific scientific analysis.

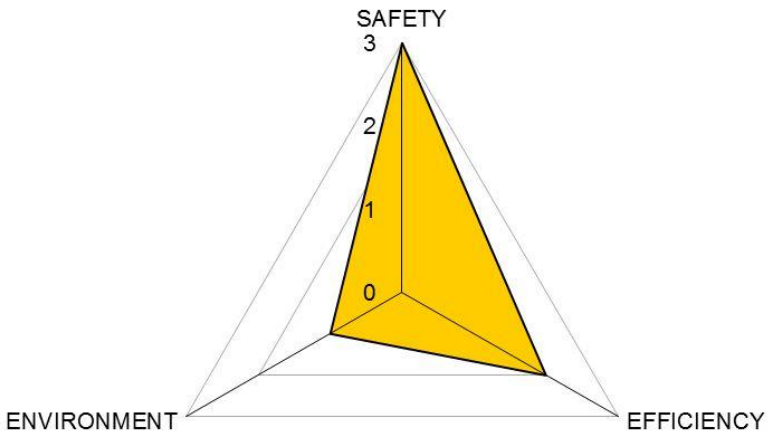


Figure 1: Service radar "Intelligent and secure truck parking"

1.2.2.2 Safety

It is anticipated that the provision of truck parking information to the driver/ haulier will help improve TPA safety.

1.2.2.3 Environmental impact

The provision of information relating to alternative parking areas may help reduce time spent looking for available parking lots, which in-turn will help to further decrease the CO2 emissions. There could also be benefits to environmental impact where identified parking could lead to less unacceptable behaviour by drivers who cannot find appropriate facilities to park.

ITP will reduce the need of building new TPA.

1.2.2.4 Network efficiency

ITP will increase the efficiency of the TPA on a road sector.

1.2.3 Current status of deployment

In most European countries the truck parking areas available are predominantly operated without the use of ITS or telematics services. National databases containing basic information such as the location, the maximum capacity and services offered at the parking/service area already exist in several countries, but not with an extensive coverage.

Some road authorities, road operators and service providers already provide static information for parking areas by lists but this information is mostly limited to certain parts of the network. Some operators of rest- and parking areas provide static information through leaflets, maps, internet based information platforms, etc. In most cases this information is incomplete and focuses more on the services provided than on the parking area's infrastructure or capacity.

Following the growing demand for parking capacity in recent years, road authorities, road operators and service providers of some Member States started to collect real-time data using various detection systems and implementing parking management systems. Until now these projects are mostly isolated applications and/or pilot projects. Coordination between different road authorities, road operators and service providers is still at a low level. Due to the relatively new domain of freight and logistics services there remains a lack of experience on how to best to implement and operate such systems. It is recognized that due to the obvious international dimension of goods vehicle traffic, efforts to build up ITS services need to be harmonised.

Pre-trip travel planning has developed in recent years from simple maps to dynamic smartphone applications and easy-to-access websites with TPA as Point of interest, or to information platforms like TRANSPark by the IRU/ITF. A few European road operators employ websites as a means of information provision, which can assist with route planning.

On-trip information using a Variable Messages Sign (VMS) is exemplified in only a few instances across Europe (e.g., in France, Italy, Germany and Austria). These countries are at least experimenting with ITP services at parking areas.

The use of **in-vehicle navigation** systems with parking information through RDS-TMC (Radio Data System Traffic Message Channel) is also possible. In-vehicle information systems seem to be the best basis for driver guidance because information about free parking areas is given in an explicit way. The drivers should only receive the information where free parking lots are (information should not be provided where there is no capacity). This can be done for sections only by in-vehicle devices.

There is also an exponentially growing market for **smartphones** which can act as in-vehicle navigation systems and/or provide parking information through mobile websites.

The next developments will be parking **applications on smartphones**.

The responsibility for combating crime is a shared responsibility of private stakeholders (shippers, transport companies, insurance companies, drivers and operators of parking areas) as well as public stakeholders. In

preparing a classification for and certification of these parking areas, a broad consultation took place. This resulted in a classification as described in the Annex to the Resolution - EU resolution on preventing and combating road freight crime and providing secure truck parking areas (Council meeting of the Ministers of Justice and Home Affairs, 8 and 9 November 2010).

It is also advised that these (certified) parking areas may be marked with a uniform road sign (Vienna Convention on Road Signs and Signals of 1968; implemented by the UN ECE Consolidated Resolution on road signs and signals).

1.2.4 European Dimension

European Union regulations oblige goods vehicle drivers to take regular breaks (EC Regulation 561/2006). Following the revision of the regulation on driving times, which calls for increased control, the absence of rest areas can result in problems for the road and local authorities whose responsibility it is to ensure that there are adequate rest areas and parking spaces.

The measure concerns priority areas identified in the EU ITS Directive (2010/40/EU):

- Optimum use of road, traffic and travel data
- Continuity of traffic and freight management ITS services
- ITS road safety and security applications,
- Linking the vehicle to the infrastructure

The provision of information and reservation services for safe and secure parking places for trucks and commercial vehicles are priority actions in the ITS Directive.

The geographic coverage is primarily related to the TEN-T network (Trans-European Network for Transport) with access roads, and around conurbation areas, depending on local conditions and requirements. Existing parking information requirements across Europe are currently heterogeneous whilst differences in national policies and investment strategies will guide future deployment. By defining the Levels of Service and criteria most important to the information service, future deployments can be made in line with this progression towards greater European harmonisation of service levels.

2 Part A: Harmonization Requirements

2.1 Service Definition

Two different services with regard to intelligent truck parking are considered:

- Information and guidance (on truck parking areas)
- Reservation (of truck parking spaces)

Production and distribution of static and dynamic information on the truck parking situation on the TEN-T networks and access roads to manage the parking space, support the observation of rest and driving periods for drivers, reduce dangerous parking and improve drivers, load and goods vehicle safety and security. This information could be provided on-trip and pre-trip using different channels of information and different end-user devices.

Beyond that the service can be combined with the individual reservation of a truck parking space with the help of telematics services via different devices. A parking space on site is reserved (blocked) and kept free for the pre-identified goods vehicle.

2.2 Functional Requirements

2.2.1 Functional architecture

Goods vehicle drivers and dispatchers need information on fuel stations and rest areas on their route both before and during their trip. This may be done through the information providers. In Europe, private and public information providers are involved in this information provision (see organisational requirements).

The figure below shows the typical functional architecture of the information service. The vertical lines show where it is appropriate to segment the whole functionality of the service into a maximum of three sub-functions.

Functional requirement:

- **FR1:** Functional decomposition and the provision of standardized interfaces **must** be carried out to ensure interoperability in cases that the service is carried out by more than one organisation:

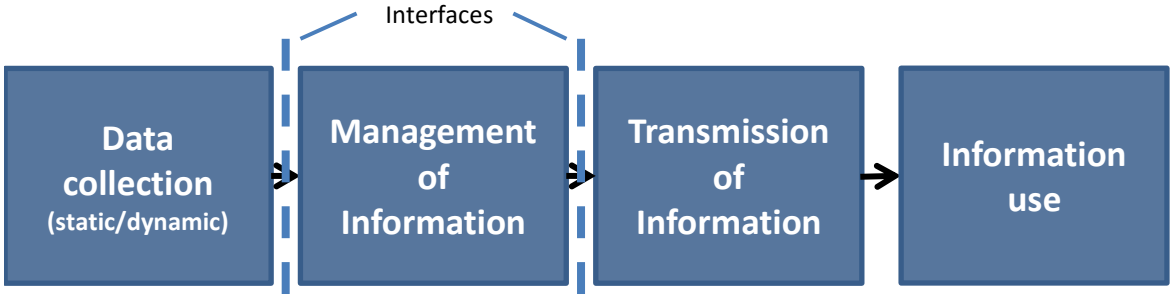


Figure 2 Functional architecture of the information service

2.2.2 Functional decomposition[1] and interfaces

Sub-function 1 "Data collection (static/dynamic)"

The devices and methodologies for traffic data collection are not covered by this deployment guideline. Amongst other considerations they depend on the particular data collection system used and are left to the

[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.

operator to select. Note that even dynamic data collection isn't only done by automatic systems. Note that the number of spaces must be defined by the operator.

Functional requirements:

- **FR2:** The data provided for static information **must** be based on a consistent and geographic reference mode, which **must** be part of data description.
- **FR3:** The geographical basis for static and dynamic information **may** be left to the involved partners to define.
- **FR4:** The basic static information **must** be offered:
  - Location (basic information)
  - Location (latitude/longitude)
  - Primary road identifier (road class)/direction (upper target goal)
  - exit/distance from primary road
  - name, address
- **FR5**: Advanced static information about the parking area type **should** be offered if available:
  - truck only/"combined" parking facility (including non-goods vehicle)
  - number of spaces for trucks (defined by operator)
  - number of spaces for cars, busses (defined by operator)
  - fee or not
  - features and services for dangerous goods/refrigerated goods vehicles/abnormal goods
  - service features (facilities, fuel card, security, LABEL European standard certification scheme for truck parking areas)
- **FR6:** The data provided for dynamic information if available **must** be based on a consistent and geographic reference model and a time validity model, which **must** be part of data description (see above).
- **FR7**: The geographical basis for dynamic information **must** be the same or compatible as the one for static information.
- **FR8**: The dynamic information **may** include the:
  - availability of the truck parking areas based on the occupancy
  - current number of free goods vehicle parking spaces.
- **FR9:** Historic dynamic information data **may** also be required for algorithms or forecast.

Sub-function 2 "Management of Information"

Within Europe different methodologies exist to manage the static and dynamic data. These methodologies are not covered by the present guideline and are left to the operator to select. They depend amongst others on the (until now) covered data and the need to offer it.

Functional requirements:

- **FR10:** Source, scope and quality of data provided by data owners to service providers **must** be defined and **must** be part of data interface description.
- **FR11:** To foster interoperability between all parties involved (content providers/non-technical sources, service operators, service providers) the sub-function **may** provide the following interfaces conforming to the following information structure:
  - static information
  - dynamic information

- comment (free text)
- information source

Sub-function 3 "Transmission of Information"

Information provision is carried out by different service providers in accordance with specific business models. The information provision to the truck driver has to be done using various information channels e.g. on signs and end-user devices (see introduction). When providing customer oriented forecast and real time information services, the users' benefit can be increased by providing parking information combined with general traffic information (i.e. traffic condition and travel times (see TIS-DG03/05), weather information (see TIS-DG06) and speed limit information (see TIS-DG04)) as well.

Functional requirements:

- **FR12:** The geographical area of information dissemination **should** take into account the characteristics of the information transmission channel used.
- **FR13:** To foster interoperability between all parties involved (content providers/non-technical sources, service operators, service providers) the sub-function **may** provide the following interfaces conforming to the following event information structure:
  - static information
  - dynamic information
  - comment (free text)
  - information source

2.2.3 Advice for functional requirements

Functional advice:

- The capacity of the parking area should be defined in relation to the measures of goods vehicles.
- The provision of the static information must require maintenance and availability of a list or a database as well as regular, systematic data maintenance.
- For the initial determination of truck parking possibilities all truck parking areas must be recorded. A truck parking area provides suitable parking possibilities for several HGV and it is relevant when considering size and location in relation to the normal traffic situation.
- Truck parking facilities beside the highway may be no more than 1 km from the junction.
- The road link to truck parking facilities should be suitable for heavy goods vehicles both with regard to its construction and suitability, i.e., giving due consideration to traffic safety, environmental issues and the interest of the residents.
- The collection of dynamic (up-to-date) information must require the recording of the presence of goods vehicles through staff on site or by way of automated procedures. They are either vehicle-related systems (such as probe vehicle data/floating vehicle data, satellite-based location systems) or infrastructure-related technologies for automated data collection. For infrastructure-related technologies there must be detectors in the truck parking spaces themselves (direct data collection), in the access and exit roads of the parking area (indirect collection by means of registering the arriving and departing vehicles) or technologies that cover detection across several parking spaces (e.g. mast mounted cameras).
- The detectors must be reliable and robust within their operational environment, and therefore offer suitable protection against environmental influences (rain, snow, fog, darkness), vandalism and other forces (water, winter service).
- The automatically detected data may subsequently be further improved by the relevant algorithms to achieve good dynamic information without manually calibrating the system very often (e.g. comparison with historical data, with account of the physical upper and lower limits for occupancy).
- To ensure robustness, the number of free truck parking spaces should be regularly calibrated.

- If there is no permanent manned presence in the direct vicinity of the truck parking areas, the installation of (pivoting) CCTV cameras may be recommended for validation of the detector data. The images may be transmitted to screens in the traffic centre or similar installations and be evaluated there. This saves having a ride to the truck parking area. The data protection provisions regarding the use of camera images must be observed.
- The dynamic data itself should require a time stamp and information regarding its quality (period of validity).
- The smallest possible deviation from the actual/planned status should be available about 1 hour before the full occupancy of the parking area. This is when the demand for dynamic data is the highest and the information for the users is the most valuable.
- VMS may be used before the goods vehicle parking areas (recommended distance of about 750 m) as well as on the parking area itself for the guidance of the trucks.
- For the signs there must be a compliance with the requirements of the 1968 Vienna Convention on Road Traffic Signs. This means that the colours red, yellow and green cannot be used to show the “degree of occupation” of the truck parking area. Signs with language dependent written messages such as “free” are also not recommended.
- Dynamic signs may be helpful within the rest facility if there is only one access way to reach several separate parking areas. If information on the occupancy of multiple rest facilities are on a single sign this quickly overtaxes the drivers (goods vehicle driver with 80km/h has 3 seconds for recognising and understanding). Here modern information systems in the vehicle cab offer better solutions to the driver.
- The relevant parking spaces on site must be reserved at an early stage. This requires the management of the entire truck parking area with the allocation of parking space or the physical blocking of individual truck parking spaces by, for example the use of a chain. In every case there must be staff on site to guarantee the availability of the parking spaces. Reserved places have to be subtracted from the number of available places.
- For security operators should use the LABEL definitions (http://truckparkinglabel.eu).

2.3 Organisational Requirements

(ITP)-Actors and their roles are the same as in TIS. A general overarching description of the key actors and their roles in the value chain in providing TIS-services is outlined in the TIS Reference Document "Guideline for Traveller Information Core European Services" (TIS DG01).

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. These parties and their role in the organisational structure of the ITP-service demand special attention and finally agreements/ contracts.
- **OR2:** Contracts/agreements **must** be established, which set up the rules of cooperation.
- **OR3:** Collaboration processes/workflows and interfaces **must** be described.
- **OR4:** The information provision **should** be in accordance with any management plans which are in operation of the road authorities or traffic management centres.

Organisational advice:

- Since static data is subject to continuous change, a systematic standardised maintenance of the data should be recommended.
- There should be a robust calibration at regular intervals for dynamic data. The frequency of calibration depends on the requirements of the users, the accuracy of the detectors, the number of entering and departing goods vehicles, and the algorithm employed. In the case of daily calibration (which illustrates major discrepancies) it is recommended to calibrate shortly before the area is fully occupied.
- It is not legally possible in all Member States to restrict the general use of public parking areas through the reservation for individual users. In these countries only private sector solutions are conceivable.

2.4 Technical Requirements

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.

As a minimum for static data a list of parking area characteristics can be passed on to interested third parties. But since static data is also subject to continuous change (closures, upgrading, changes in service) the development of a maintained data base is recommended. As DATEX II is the relevant specification for data exchange on the TCC-TCC and TCC- service provider level, the basic elements for the interface between TCC and private sector exist in the current DATEX II data model. For sophisticated information and services a model extension is needed.

Technical requirements:

- **TR1:** To foster interoperability between different actors involved in the traffic information chain DATEX II profiles[2] for static and dynamic information **must** be used.

[2] DATEX 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

Technical advice:

- Barriers – where they are legally admissible – are an alternative. However the use of barriers may encourage the goods vehicle driver to think that use could be subject to charges.
- Detectors in the entry and departure road of the rest facility or the truck parking area should be arranged in a way which catches every driving movement. As an alternative it is possible to collect the data manually and then to feed them into electronic systems (handheld devices, PC) for processing and distribution.
- The pre-determined area of use of the individual detector types has to be observed. Depending on the individual detector, minimum speeds and crossing angles have to be taken into account for the detection at entry and exit points. With some detectors there are erroneous detections in the case of stationary vehicles, when driving in columns with close proximity or for goods vehicles trucks with trailers. Depending where in the parking area they are situated, the detectors have to carry out a classification (2+1, 8+1, length of the vehicle).
- Accuracy of the detection is also important. The most recent development is the combination of detectors with various physical parameters and a subsequent fusion of the data. Generally it is recommended to carefully lay down the cross-section of the coverage and make a request for tenders based upon defined functional parameters.
- For detection within individual spaces the detectors should be arranged in a way which also covers shorter goods vehicles.
- Video cameras for the calibration of the results may have a sufficient definition to recognize trucks even if individual number plates are not legible.
- Management of reservations may be achieved through call-centres, internet forms and apps.
- On site, the part of the TPA dedicated to the reserved places may be separate in order to be able to keep parking spaces selectively unoccupied. As an alternative, for example, space blocking with chains is possible.
- The preconditions for security are described in LABEL. Technical progress in equipment technology (CCTV, data transmission, security systems, barrier and access security systems) makes it possible to achieve the required security level by means of other technologies, which makes, e.g., a fence, superfluous.

2.5 Common Look & Feel

Goods vehicle drivers and hauliers want to know where to find the right general information in language independent and comprehensible form. Road side information must be provided in a language independent form, and be consistently designed so as to be understandable throughout Europe.

There are private internet platforms which enable the driver or forwarder to book truck parking spaces. As an alternative this can also be done by telephone. A charge for the reservation has to be expected.

A possible pictograph for security information has been developed, reference: EU resolution on preventing and combating road freight crime and providing secure truck parking areas (Council Meeting of the Ministers of Justice and Home Affairs; 8 and 9 November 2010).

ESG4 obtained good results for one-pictogram signs specifically indicating parking for trucks in the last and previous comprehension tests. This eases the use of VMS concerning ITP for all one-pictogram VMS available in Europe (the majority of VMS devices).

Common Look & Feel requirements:

- **CL&FR1:** Information for the end user **must** be consistent, whatever media or end user device is used for distribution.
- **CL&FR2:** The display of signs/pictograms on VMS or other end-user devices **should** be in accordance with prevailing national road codes and where applicable be in line with the requirements of the EW-DG for Variable Message Signs Harmonisation VMS-DG01:

- MS which ratified the 1968 Convention MUST respect the 1968 Convention and SHOULD consider the Consolidated Resolution on Road Signs and Signals (R.E.2);
- MS which did sign but not ratify the 1968 Convention SHOULD follow the 1968 Convention and also consider the R.E.2.

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 certain services on 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 the 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)

For more information and details, visit https://dg.its-platform.eu.

2.6.2 Level of Service Criteria

Levels of Service[3] table: Intelligent and Secure Truck Parking						
Core Criteria	**Level 0 (no service)**	**Level A**	**Level B**	**Level C**	**Level D**	**Level E**
Information on truck parking areas	None	Basic static	Advanced static	Real-time (dynamic)	Real-time and forecast for one point	Real-time and forecast for a section/for a trip
Transmission of information	None	Static Sign, maps	VMS for single site	VMS covering several sites, Internet, broadcast	On-Board technologies (App, telematics services)	
Reservation	None	Telephone	Web-based service via internet-browser	On-Board technologies (App, telematics services)		

Table 2: Level of Service criteria

The first thing to establish is what possibilities exist for truck parking management and what is necessary to solve existing problems. For the provision of information concerning truck parking, the following service levels have been defined: (Note: The levels of service for each criterion are independent. In this case, it is intended that higher levels of service offer greater capability than lower levels of service)

[3] The levels of service for each criterion are independent. In this case, it is intended that higher levels of service offer greater capability than lower levels of service.

- Level A: Provision of basic static information on parking areas
  The trucker gets basic information about the location of existing truck parking areas via maps, navigation systems and signs along the principle roads.
- Level B: Advanced static information
  In addition to the basic information provided in level A the driver gets more detailed information concerning the number of parking spaces, the available service on-site, such as toilets, fuel stations, restaurants, methods of payment etc.
- Level C: Provision of real-time information
  Real-time occupancy information is provided to the road users. Occupancy information can be transmitted via several modes. The real-time information can be given for one area only or for several areas in a section/ on a corridor.
- Level D: Level C + forecast for one point
  Pre-trip information on the current number of total available parking spaces is provided via several modes. Occupancy forecast information is given depending on the current situation, the filling rate, the traffic density, local historic profiles and actual data. According to the estimated arrival time of a goods vehicle a forecast of free parking spaces is given. No guarantee can be given that there will be free parking spaces by the time the goods vehicle arrives.
- Level E: Level D + pre-trip and on-trip forecast information on a larger area
  On-trip information on the current number of total available parking spaces (per area) is provided via several modes, either on the roadside or through mobile devices etc. The forecast algorithm will take into account a larger area and several parking sites. This level provides a better short-term forecast with a wider reach than Level D and improves the possibility to seek alternative free parking spaces available in an area within the permitted driving time. This level offers the opportunity to adapt the route choice during planning in order to optimize the use of available driving time.

It is not imperative to try to achieve the highest level. For some route sections with a low demand for truck parking level A will be sufficient. If there is a demand for service offers level B has to be chosen. Only if the congestion of individual truck parking areas requires management of the parking area do levels C to E become economically useful for a better distribution of the demand for parking.

For the provision of information the decisive factors are the (expected) demand of third parties, for example service providers, and the frequency of change of static data for the level to be chosen.

All data to be disseminated is purely informative and offered to about 20 % of the users of long-distance roads. For this reason the erection of signs only for the transfer of information is excessive in view of the large number of truck parking areas, and as level A, it can only remain restricted to individual cases. For longer route sections the information may be presented to the driver in the vehicle cab. This is the only place where there is sufficient time to receive and evaluate this information and to react accordingly. Information channels can be used before and during the trip.

For detection within private areas, manual procedures with guards can also be economical. In other cases automatic procedures/barriers would be appropriate. Downstream algorithms review the calculated number of free parking spaces. Historical comparisons and limit values (maximum and minimum capacity) offer themselves here.

For reservation, first the demand for such a service, along with the willingness to pay, has to be assessed. Then, depending on the total number of relevant truck parking areas (one or several), the economical level of use can be chosen.

2.6.3 Level of Service Criteria related to Operating Environment

Allocating the LoS to the operating environments is not useful for ITP. The necessity of ITP (stationary traffic) is not oriented towards the category of the road or the number of its lanes or whether it is prone to congestion, because these are the characteristics of moving traffic. Rather the decisive factors are the number of goods vehicles that are on the road, the importance of the road and its position in the network with the resulting demand for truck parking spaces. This demand for parking has to be determined separately and locally. It results in the number of required truck parking spaces and the necessary relevant requirement of the individual ITP levels. Finally the LoS are applicable to all OE´s.

The number of goods vehicles on the road has to be assessed with the availability in truck parking areas to be a good parameter for ITP deployment (e.g. there are motorways with low levels of truck traffic but also with very low truck parking availability and, consequently, often the problem of saturated truck parking areas.)

3 Part B: Supplementary Information

The EasyWay Deployment Guidelines contain two main elements:

- *Part A elaborates on the content of the ITS service addressed, describing the entire deployment framework including Requirements and Levels of Services.*
- *Part B is an appendix of informative content. Its objective is to illustrate part A with examples and feedback from deployments in the field.*

Part B is a lively chapter – in contrast to Part A, which by nature should be stable for a certain time – and subject to continuous development and update. The focus of Part B lies on national practices and experiences which, as cross-fertilisation material, can benefit any road operator in Europe and which are documented in Chapter "3.1 Best Practice" consisting of two main sections:

Examples of deployment 2010 - 2012

This section consists of contributions delivered by those EasyWay-Partners that have actively participated in the development and editing of the EW Deployment Guidelines 2012. Against this background, the examples - in detail listed in Chapter "3.1.1 Examples of deployments 2010 - 2012" – reflect the state of the art at the end of the year 2012. As such they delivered the basis for the discussion of the EW-deployment guideline development process and the setup of Part A "Harmonization requirements" at this point in time. But this means also that no direct relation or compliance to the harmonization requirements of Part A (as they are listed in the Compliance checklists in Annex A) can be assumed for these examples. Nevertheless, the given examples provide a concrete documentation of the state of the art at that time and in most cases, they can still be considered as current best practice.

EIP/EIP+ user and application survey 2013 - 2015

In trying to keep Part B up-to-date, the EasyWay follow up project EIP (European ITS Platform) – launched in 2013 – started two phases of activities to contribute to Part B by collecting user as well as application experiences (both technical and organisational) of national deployments that applied or at least considered the EW-DG 2012:

- *In the time period from the beginning of 2013 to the end of 2014, the EIP work programme provided essential post-processing steps to improve the usability of the DGs in ITS deployments and further to reflect the initial experiences and feedback gained with the guidelines since their release at the end of the year 2012.*
- *In 2015, the EIP+ work programme contained a follow-up activity with the goal to monitor and collect feedback on the application of the DGs in the five European ITS Deployment Corridor projects and to consolidate reporting of the results, lessons learned and best practices concerning the DG practicability and the compliance with the DG requirements on a European scale.*

The results of those two activities are based on responses on questionnaires which were circulated to national ITS deployment experts and European ITS corridor projects and finally are reflected in Chapter "3.1.2 EIP/EIP+ user and application survey 2013 - 2015".

3.1 Best Practice

3.1.1 Examples of deployment

Contributions to this chapter were delivered by those EasyWay-Partners which have participated actively to the development and editing of the EW Deployment Guidelines 2012. Against this background, the listed examples reflect the state of the art at the end of the year 2012. As such they delivered the basis for the discussion of the EW-deployment guideline development process and the setup of Part A "Harmonization requirements" at this

point in time. But this means also no direct relation or compliance to the harmonization requirements of Part A (as they are listed in the Compliance checklists in Annex A) can be assumed for these examples. Nevertheless, the given examples provide a concrete documentation of the state of the art at that time and in most cases they can still be considered as current best practice.

3.1.1.1 Example "parking space detection around Vienna – Austria"

Figure 3: pilot area around Vienna

- All rest areas in the pilot area are equipped with CCTV
- operators of the AVS Inzersdorf check the utilization rate regularly on the basis of the images
- Webcam-Images of the parking spaces are made available to everyone

Figure 4: CCTV pictures

- Information is transported infrastructure (Exchange text messages) and new signs on the route through VBA or in traffic information services archived

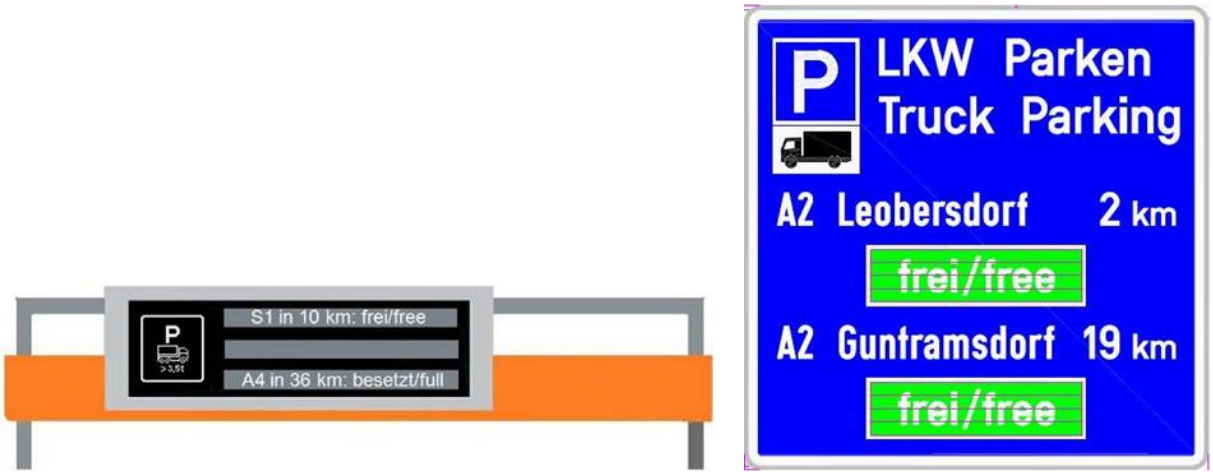


Figure 5: VMS in Austria

3.1.1.2 Example "Availability of parking spaces – France (VINCI group)"

3000 new parking spaces for trucks have been built by the 3 motorway operators which are part and parcel of VINCI group, since 2004.

However, some areas are saturated, while others offer free spaces.

For these reasons, we have decided to inform truck drivers about the possibility to park or not before arriving and entering the parking area.

Figure 6: VMS in France

We want these panels provide the information for the next 3 parking areas, with a recall of the information 3 to 5 km before each parking area. The deployment will concern our 61 largest truck parking, as the first phase of a global program.

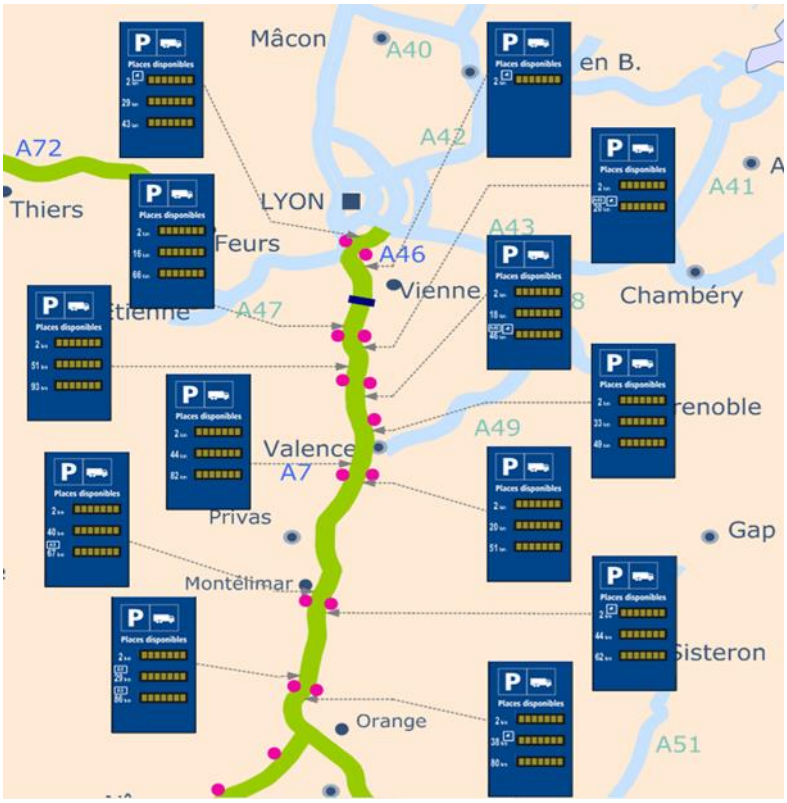


Figure 7: Example A7 Motorway

Technologies

We are testing several metering technologies, to know the occupancy of our truck parking areas.

We have had great difficulty finding a reliable system, because the different technologies available are not widely spread and mature. The different products available are still in a R&D stage.

Still, according to our observations and tests, the best system consists of individual sensors installed in the floor under each definite space of parking.

Nevertheless, the level of reliability established by place is not 100%. For various technical reasons, the reliability is very good as soon as the parking lot is almost full.

As a fact, we obtain a very high reliability as we simply need to identify the situation FREE / FULL of the parking lots.

We have also tested the technique of stock management. It consists in counting vehicles entering and leaving the parking lot. Several solutions are available to do so: loops, video, optical detection, laser detection …

The strength of these kinds of solutions is the easiness of deployment. As soon as the parking lot offers constrained access at entrance and exit, and if the traffic inside the parking is well mastered, the monitoring can be reliable.

The weakness of these solutions is the sensitivity of the measures: even a short breakdown can rapidly lead to false results about the occupancy. Hopefully, the bounds of the stock (from 0 to the capacity) can help the system to auto-correct itself.

We think that, well employed, these systems can be used if human monitoring readjusts monthly the value of the stock.

3.1.1.3 Example "Freight & Logistics Information Services for Freight Transport (Parking Place) – Italy (Confederazione Autostrade Spa)"

ITS service description

The study has been carried out following the designing and implementation of Autoparco Brescia Est, along Corridor V. Collaborating with ABE Srl, Confederazione prepared a parking places security and safety model and a model for the use of smart technological systems in parking places.

The Italian Minister of Transport opened officially Autoparco Brescia Est on October the 24th 2009. Confederazione produced an in-depth study on the building of a system of equipped truck parkings along Corridor V in the north of Italy; such study was the basic reference for technologies and services in the Autoparco Brescia Est implementation.

The study evaluated the costs and stressed the importance and the need to build new parkings in order to improve road safety and security. The new truck parkings described in the study are respectful of the Intelligent Truck Parkings guidelines prepared by the Freight and Logistics European Study Group.

Requirements specifications

The required targets were mainly defined together with the Transport Association FAI and in agreement with the national recommendations (Ministry of Transport cooperation.

Lessons learnt / factor of success

- Technical
  The implementation was a real success from the technical point of view, considering in particular the advanced technologies applied, in particular for security (e.g. video control) and for environment (e.g. photovoltaic powering).
- Institutional/organisational
  But also the organizational efforts resulted in a great success, as the entire concept of a secure parking place, together with advanced services to vehicles and drivers was quite new, requiring then specific study and a new organizational approach.

Impacts assessment / results

Impacts were achieved on many fields, but particularly on safety and security, travel efficiency and environment.

Documentation available on the project

- Sistema di luoghiattrezzati per la sostadell'autotrasporto – IT
- Sistema di gestioneintegratodell'Autoparco Brescia Est (IT) – Infracom Italia Spa – 2008
- Pannelli di indirizzamentoparcheggio e controlloenergiaelettrica (IT) – Infracom Italia Spa – 2008
- Dangerous Goods in Europe: Rest Areas study. (EN)
- ES3 Freight and Logistics Information services for Freight Transport (Parking Place) (EN)

Figure 8: Autoparco Brescia-Est

Figure 9: Guarded Entrance

Figure 10: Pay machine

3.1.1.4 Example "Truck Parking Management on the Hungarian Transit Road Network"

ITS service description

Dynamic information is very important for the well-balanced use of capacities. The largest Hungarian motorway operator, the State Motorway Management Company intends to provide dynamic information using variable message signs on the main truck transit routes, in this phase concentrating on M1-M0 route, where the share of HGVs is the highest.

In this pilot site, way of determining the exact number of free parking lots is based on a unique 3D video analysis system, to avoid false detection (e.g. in winter weather conditions).

The whole truck parking area is covered by 3 elevated double-cam surveillance points. The amount of free places is shown on a VMS panel some 15 km far from the pilot site as real-time information.

Later on with the extension of this monitoring system, truck drivers may plan their stop using the dynamic information indicated on this type of VMS panels.

Requirements specifications

National recommendations for the use of VMS panels.

Lessons learnt / factor of success

-

Impacts assessment / results

The main goals of the pilot project

- to optimise the use of the existing infrastructure in terms of parking facilities and
- to provide relevant and suitable information to the European truck drivers

are successfully achieved.

Documentation available on the project

Truck Parking Management on the Hungarian Transit Roads, 3rd EasyWay Annual Forum, Lisbon 2010

Figure 11: 3D picture of the TPA

Figure 12: VMS

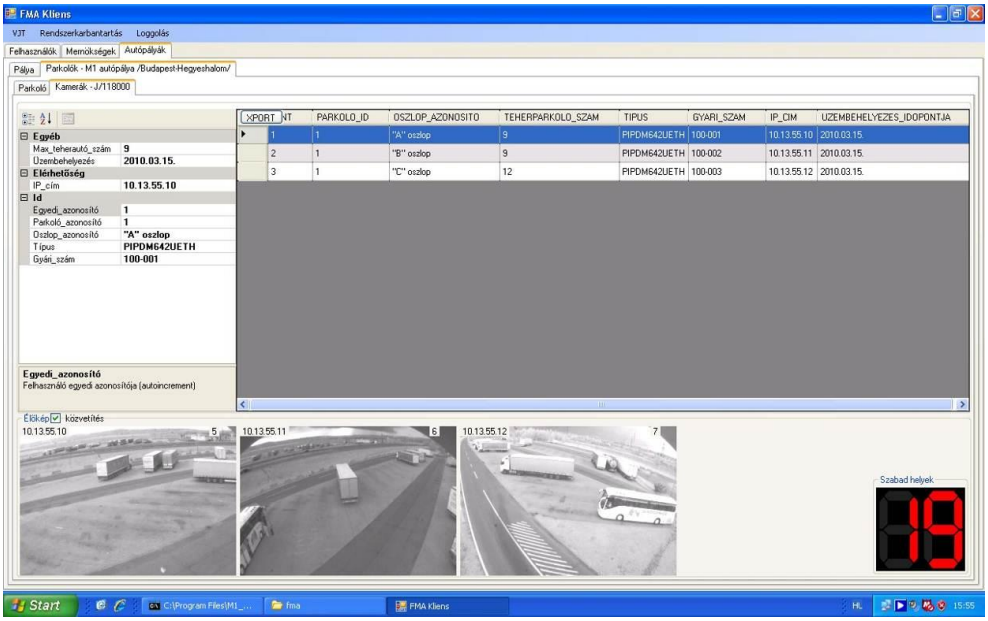


Figure 13: monitoring system

3.1.1.5 Example "Mobility Data Marketplace - Germany"

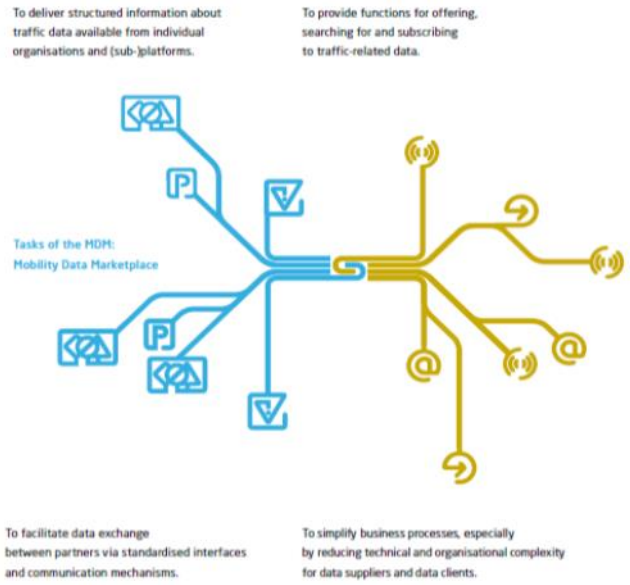


Figure 14: Tasks of the Mobility Data Marketplace

The MDM (Mobility Data Marketplace) aims to support the business processes of its users and to facilitate efficient data exchange. The market place is supposed to promote innovative mobility services offered by private service providers, along with high-quality mobility management by public road operators. A very important aspect is the active integration of all types of stakeholders.

A new range of services will provide transport users with high-quality, current information at all times. The data required for this purpose can be traded on the MDM: Mobility Data Marketplace. Clearly defined legal conditions (contracting parties: data provider and service provider; MDM is only responsible for the exchange itself) enable safe and predictable investments.

The project aims to significantly ease the exchange of traffic data. The business processes of all participants are simplified, with new options opening up for traffic management. In addition, the market is to provide private service providers with attractive incentives for new, innovative mobility services.

Any market requires a marketplace that exposes the range of offers and promotes the exchange of information. This also applies to the newly emerging market for dynamic traffic data. A central online platform is to bring the providers and users of dynamic traffic data together.

The MDM: Mobility Data Marketplace will centralise the profiles of all online traffic data available all over Germany. As a metadata platform, it creates more transparency for stakeholders in the newly emerging market and promotes cooperation. Service providers, public authorities and other users can offer and search for data. The initiators of the MDM are the Federal Ministry of Transport, Building and Urban Development and the Federal Highway Research Institute (BASt).

Data suppliers can present themselves and the data they have to offer. For data clients, it becomes clear which data are available and the new easy and reliable ways of obtaining data enable new mobility services. Providers of data processing/enhancement support will be granted comprehensive opportunities to market their services.

All potential suppliers of traffic data – public or private – may become users of the MDM. The group of potential data clients comprises – amongst others – providers of navigation services, for example, broadcasters, road operators and traffic management authorities as well as logistics companies. Providers of

data processing/enhancement support will, for example, convert the data to standardised formats and assess the data quality.

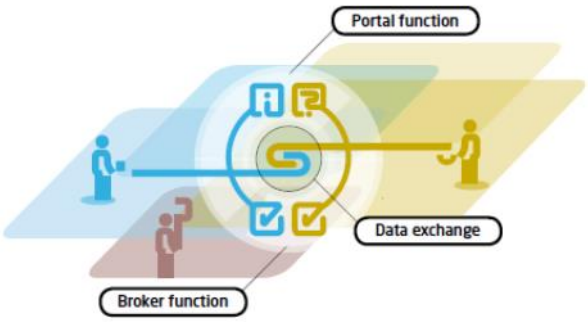


Figure 15: Functions of the Mobility Data Marketplace

Portal function

Searching for data providers, presenting your own offerings, knowing what's going on in the market

Broker function

Reliable and secure exchange of data and a detailed logging of all processes

A simple principle for the MDM

The portal function ensures market transparency, while the broker function provides reliable and secure data exchange.

3.1.1.6 Example "Survey on the parking situation - Germany”

The BASt (Bundesanstalt für Strassenwesen, German federal highway research institute) commissioned a survey on the parking situation for HGV on the TERN in night hours in Germany (considering public and private parking areas nearby the motor ways)

The results are shown in the picture; the colours refer to the number of parking spaces missing at public and private parking areas:

- Green: no parking spaces missing
- Yellow: 1 parking space missing per km
- Orange: 2-5 parking spaces missing per km
- Red: more than 5 parking spaces missing per km

Figure 16: Parking situation for HGV on the TERN in night hours in Germany

3.1.1.7 Examples "Provision of static information – Italy”

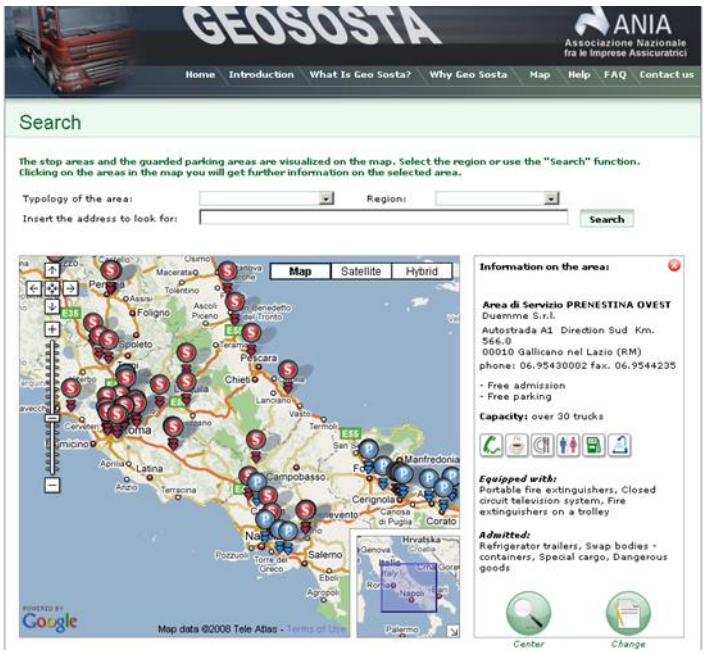


Figure 17: ANIA: website GEOSOSTA

The Geososta website of ANIA (AssociazioneNazionalefra le ImpreseAssicuratrici) in Italy provides static information on parking areas, including the location, the capacity as well as the available equipment. Further more information on admissions for special cargos or dangerous good is provided.

Websites of this kind are available in several countries throughout Europe.

Source: http://sosta.smaniadisicurezza.it/jsps/192/Menu/201/Home.jsp

3.1.1.8 Example "Provision of real-time information (on-trip) - Germany"

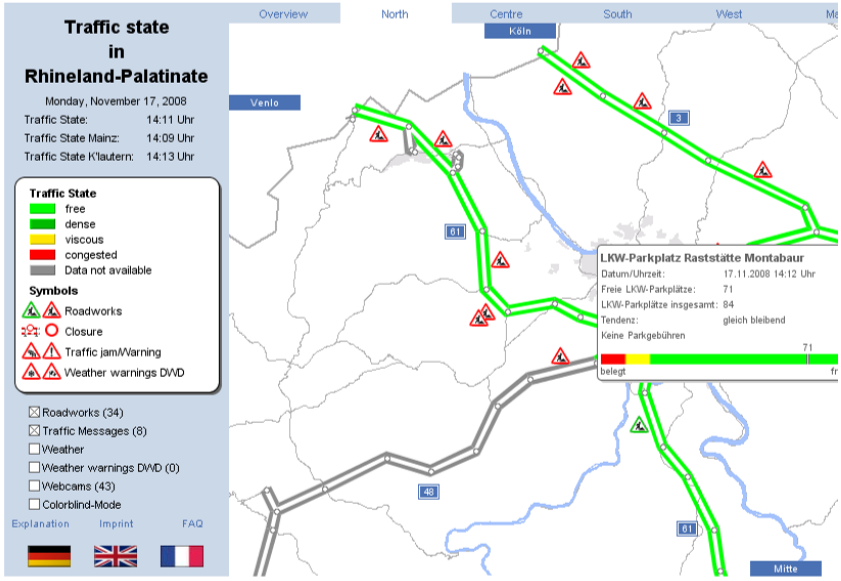


Figure 18: RLP: real-time information provision

In Rhineland-Palatinate (RLP), Germany, real-time information on current occupancy of the telematics controlled parking areas is provided on the internet. Furthermore an occupancy trend is given.

Source: http://www.verkehr.rlp.de

3.1.1.9 Examples "Management of truck parking on a single area – Germany"

Figure 19: VMS with currently available parking lots

At the parking area Aichen in Germany, the amount of free parking spaces is shown on VMS.

The configuration of the area is organised so that trucks and passenger cars are separated throughout the entire rest area.

The real-time occupancy is assessed by counting vehicles at the entrance and at the exit.

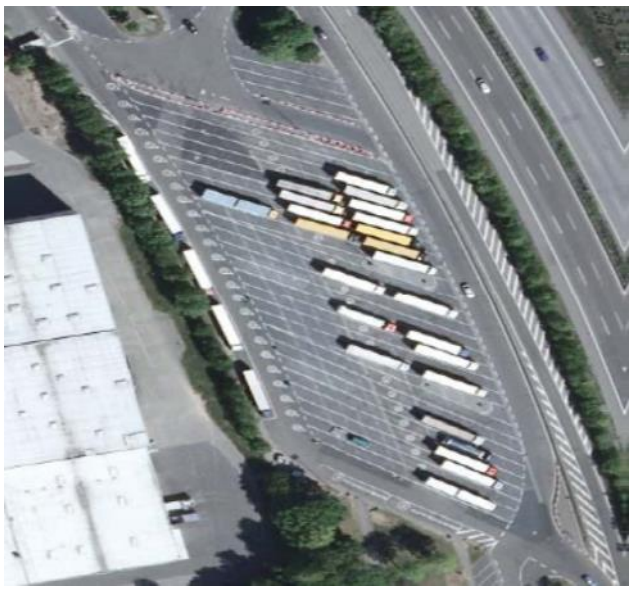


Figure 20: Example Montabaur: optimised organisation of the parking area

Parts of the service have been implemented through the EasyWay CENTRICO project as the Telematic Controlled Parking (TCP) at the Montabaur Pilot by the A3 motorway in Rheinland-Pfalz. The A3 in Germany is one of Europe's major corridors and passes through Rheinland-Pfalz. The entrance to the parking area is equipped with a barrier and a terminal. Upon arrival, the driver uses the terminal (with 16 languages to choose from) to enter both the desired departure time and vehicle type (identifying the length of the vehicle). A parking space is then allocated either behind a vehicle with an earlier departure time or at the front of a new lane. Due to massive problems with the detection and the terminal use the system has been significantly upgraded in 2012/2013 in order to improve the reliability of the published information and significantly reduce the human resources needed for periodical manual calibration.

3.1.1.10 Examples "Management of truck parking on a section – France"

Figure 21: Occupancy dissemination on parking areas in a section

In January 2008, SAPN (Société des Autoroutes Paris-Normandie) set up a sign along the motorway A13, ahead of the parking area Bosgouët, in direction of Paris. This service combines the real-time occupancy information of 12 truck parking areas and up to 90 parking areas have already been counted.

The sings indicate the number of available parking spaces at the named area as well as at the two following areas. An investigation had been carried out only eight weeks after the implementation to see the impact of this service

3.1.1.11 Examples "Provision of facilities for booking – SETPOS and Highway Park"

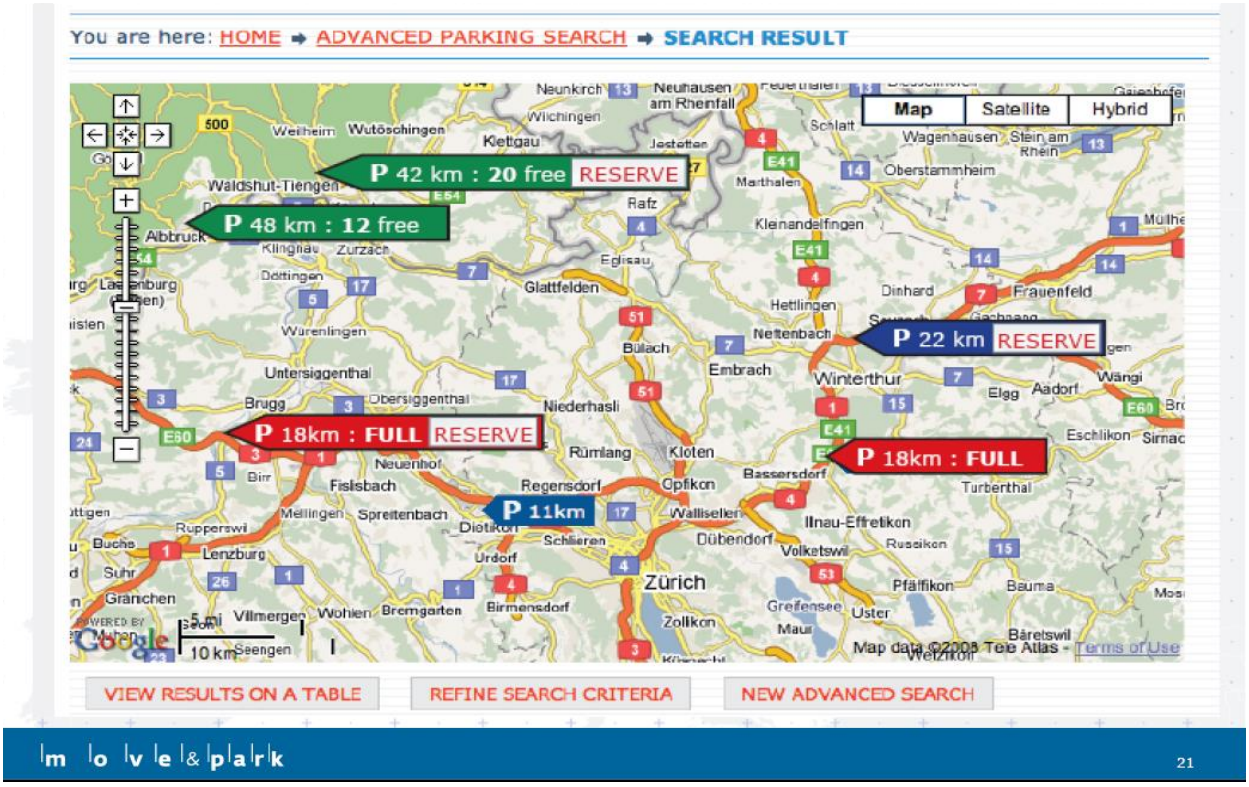


Figure 22: SETPOS internet information platform

Figure 23: SETPOS reservation facility

Highway Park is a private German truck parking reservation system. During the ongoing pilot phase 20 “Autohöfe” (private truck stops) in south-west Germany are connected to the system, reservations of 3 parking places per parking area can be made via an internet portal or call centre. The parking areas do not have to be equipped with special technical devices, the system works with a parking attendant already working for the truck stop, or with technical infrastructure like parking gate on the spot.

Reservations have to be paid; the payment can be made with Fuel Cards. This means that there is no need to make invoices and the fee is paid directly by the hauliers and not the drivers. The collected parking fee remains to the truck stop.

The reservation system can be easily integrated in other websites, using a single central database. Furthermore any supplier of truck parking space or service provider can be connected to the reservation system.

The usage of the website and the number of registered users has steadily increased since the start of the programme in end 2008. The costs of this pilot are currently estimated with round 50.000€. Based on the success of the system in Germany, the Highway Park organisation will expand to other European Countries

3.1.1.12 Example "Implementation of fee required parking areas – France (ASF)”

Confronted with an important deficit in truck parking spaces along the corridor A7/A9 (about 1.500 spaces are missing – compared to 6.700 existing spaces – the construction is foreseen in the contract of lease until 2011). ASF (Autoroutes du Sud de la France) formulates the following objectives:

- Construction of complementary parking areas, essentially on the service areas, to reduce illegal and dangerous parking
- Provision of additional services, designed to fulfil the needs of the truck drivers and haulers

- Provision of a standardised, secured and charged area with controlled access
- Provision of real-time information on available truck parking spaces

The truck parking services can be divided into two areas: the services for truckers and the security of the goods. Those two areas combined lead to six categories for the parking areas:

- A1: parking areas with basic service area
- B1 = A1 + vending machines (and/or restaurants open between 18h and 22h) + plus high number of tables, sanitary facilities, showers
- B2 = B1 + secured parking (with access control, service costs 5 Euros / night)
- C1: service area (shopping and restaurant)
- C2 = C1 + secured parking (with access control, service costs 5 Euros / night)
- C3: gas station, restaurant, showers and sanitary facilities, rest areas with TV, information point, WiFi, car wash, patrolled parking (service costs 15 Euros / night)

The secured and patrolled parking areas are beneath others measures to include vehicles with dangerous goods.

Additional measures to be taken care of are defined as follows: priority given to the owner of the paying system in the secured parking areas when the remaining capacity is less than 25%, discussion with insurance companies to propose the percentage for the permanent use of secured parking areas, accompany the penalty of the police.

The programme is expected to be realised between 2009 and 2011, it includes 1.490 places out of which 540 with secured parking areas.

3.1.1.13 Example “SETPOS and LABEL: concept for secured parking and labelling”

The SETPOS (Secured European Truck Parking Operational Services) project is co-financed by the European Commission (Directorate General for Energy and Transport, DG TREN) and consists of different European partner, such as Aecom, Move & Park, Vinci concessions, … The objective of SETPOS is to define standards (and service levels) for secured parking and to implement five pilots across Europe.

Figure 24: Fence and CCTV

Figure 25: Gate

The SETPOS system consists of a total secured solution: fences, video surveillance, ticketing system to calculate the occupancy and the payment, very sophisticated online system with a possible extension for advances booking functions.

The project was finalised mid 2009 but public evaluation results or public project results are not available yet.

At the same time SETPOS launched the LABEL project, which aims to propose a European certification label for secured parking.

3.1.1.14 Example: Danish ITP at Ustrup East

ITP

With the new ITP facility at Ustrup East, parking is managed by a fully automatic and unmanned system. The system directs and allocates the trucks to parking lanes, depending on the drives entries.

From the beginning it was an imperative precondition that the system should be fully automatic. Today ordinary truckstops functions without any guidance from ground personnel, why it is important to continue this in order not to create a dependency on a large workforce, if and when the system is implemented across a large number of rest areas.

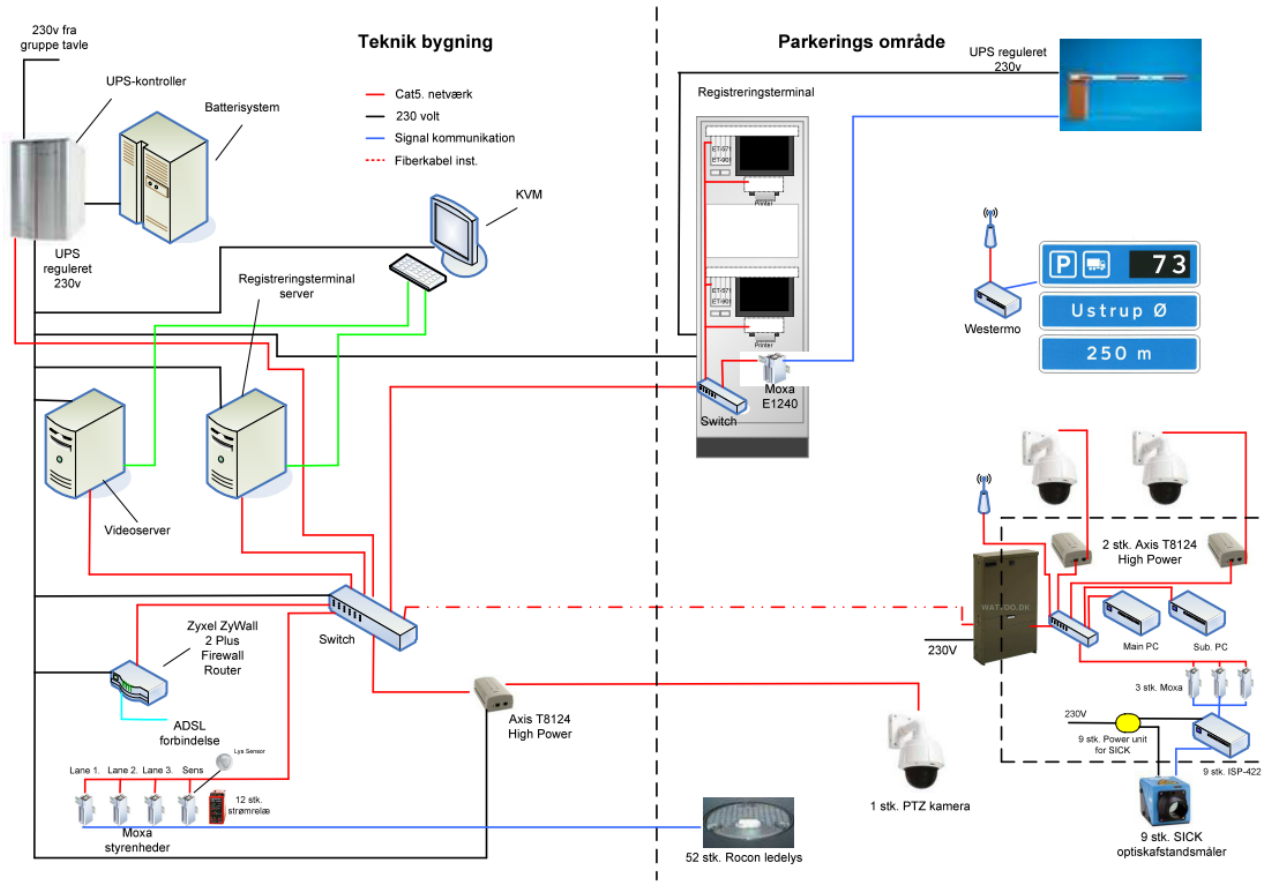
The development of the ITP pilot project has been made possible by an economic contribution from the EU through the EWTCII (East West Transport Corridor) project

General concept – ferry lanes

The basic concept behind the design is that the system 'packs' vehicles into columns, depending on their departure times. The same concept is known from lanes at ferry ports. This means that vehicles that are set to leave the rest area immediately after one another are also placed after one another in the same column. In this way the columns are freed up within a short time span and there will once again be room for new vehicles on site.

The technical features and layout

The entire layout of the technical solution can be seen on the figure below.



The system consists of various components that all serve to ensure that the users have a good experience with the system. At the same time, the system is designed to have the best possible conditions for packing vehicles appropriately with a minimum of potential sources of error.

Generally seen, the system consists of an arrival area with a terminal and a gate barrier, as well as a parking area divided into columns. In addition there are a number of service features, such as lane lights that show drivers the way to their assigned column, and VMS along the highway that show the number of available parking spaces at Ustrup East.

Upon arrival at the arrival area, drivers enter their desired hours of rest into the system, and lane lights in the pavement show them the way to their designated lane. When the vehicle has parked in the correct lane, the lane detection scanners rescan all the lanes to measure and calculate the remaining capacity and to ensure that the driver has actually parked in the correct lane. Should a driver park his vehicle in a wrong lane, the system automatically closes the given lane, until the stray vehicle has left the area.

Experiences from other pilot studies have led to a choice of a sensitive lane detection system. It uses industrial lasers to continuously measure the remaining capacity of the individual lanes with a accuracy down to 1 cm. The precise measurements help to create a robust system with optimal conditions for packing the trucks in columns. And we always have the precise and reliable information of the remaining capacity in every individual lane.

3.1.2 EIP/EIP+ user and application survey 2013 - 2015

3.1.2.1 Results “Concept and Practicability” questionnaire

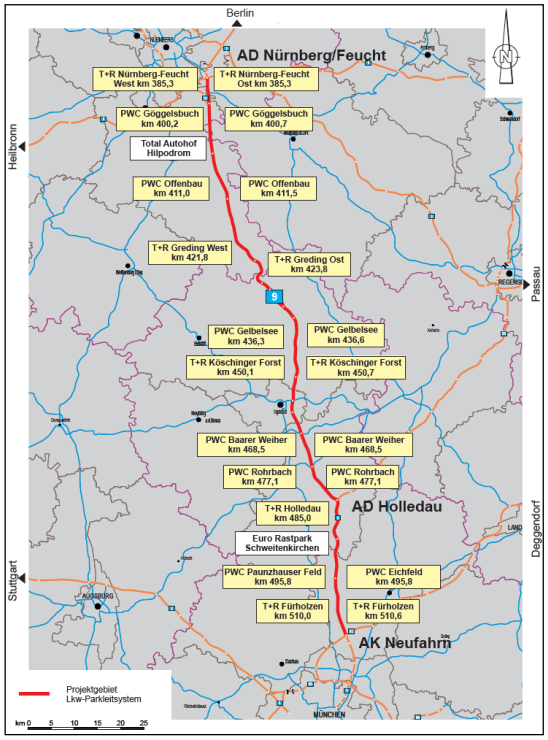
The applicability questionnaire for the FLS-DG01 was answered by 8 projects. Parts of this DG’s requirements were easy to apply, other have been hard to apply. The costs to apply the DG have been rated mainly between medium and low. According to this, the acceptance of the deployment guideline is rated medium to high.

3.1.2.2 Results "Compliance checklists” questionnaire

The compliance checklist for this DG was answered by 10 projects. Most of the functional requirements, technical and organisational requirements were met. Although there is no category of requirements which has been fully fulfilled by the projects.

3.1.2.3 New best practice examples of deployment 2013-2015

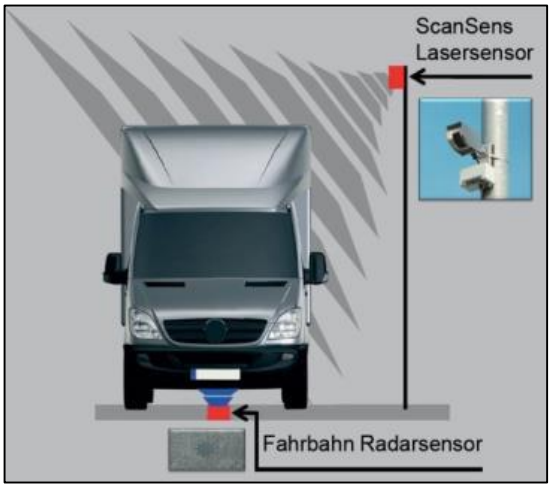
ITP A9 between Munich and Nuremberg



On the motorway A9 between Nuremberg and Munich Truck parking spaces are very limited. According to current traffic counts the average daily traffic is between 66,000 vehicles / 24h and 105,000 vehicles / 24h. The corresponding flows in heavy traffic are between 10,000 trucks / 24h and 12,000 trucks / 24h. According to a study undertaken by the Federal Highway Research Institute (BASt) in 2008 a shortage between 1 to 5 spaces per kilometre during the night was identified for this road section.

To avoid dangerously parked trucks and to give the truck drivers information about the availability of parking space an ITP System was implemented. The project was undertaken on the section of the motorway A9 between Nuremberg and Munich and includes 21 parking / resting areas along the indicated motorway section (see pic) as well as two private Autohöfe (private off-motorway service areas).

The system is made up of an automatic truck collection system at the access and exit points of the parking/resting areas. This allows the ITP System, through balancing the access and exit points measured data, to calculate the number of trucks which are staying on the parking areas. This data is transmitted via fibre optics to the TCC where the data is transmitted to the national access point as well as to service providers. Among others TMC messages are generated to inform truck drivers about parking space availability.



Innovative truck parking system on Bavarian motorway A3 (Nuremberg and Regensburg)

On the motorway A3 between Nuremberg and Regensburg at the rest area Jura-West an innovative truck parking system has been put into operation the 19th of February 2016. On the existing parking area the truck parking places have been reorganised to offer around 50% more parking places. The trucks are parking in a compact way, i.e. up to 4 trucks in a row (without a driving lane between trucks as it was before) and the rows are arranged side by side. Altogether the pilot project consists of 35 parking rows with now up to 105 parking places (before 66). Above each parking row a dynamic display shows the continual departure time. Thus it is guaranteed that trucks within a parking row have the same or an earlier departure time.

The truck drivers can get further information on the pilot projects` website: www.kompaktparken.de. The website shows several pictures/videos of the system as well as an up-to-date truck parking occupancy chart showing each parked truck with the arrival and assigned departure time. Furthermore, the website contains an instruction manual in nine different languages. The website is also available for free at the rest area via the installed WLAN system.

The following pictures give impressions of the pilot project:

Depart. Thu
21:45
Depart. Thu
22:15
Depart. Thu
22:15
22:15
22:45
12
P
Kompaktparken
i
Abfahrt
Reihe
4
3
2
1
15:45
16:30
15:45
16:15
16:15
16:30
15:30
16:30
16:00
16:15
16:30
15:30
16:30
18:30
18:30
21:30
21:30
21:30

The motorway A3 between Nuremberg and Regensburg is one major motorway stretch with up to 90.000 ADT and up to 20 % HGV share.

Truck parking spaces are very limited. The new system will support the avoidance of dangerously parked trucks in offering enough parking spaces. The project supports ITS directive priority action e - the provision of

information services for safe and secure parking places for trucks and commercial vehicles - and is in line with the specification. Besides the increase of safety because of expected less dangerously parked trucks the project will increase safety as well through the implementation of a video system. Indeed the purpose of the video system is not surveillance but rather it is necessary to monitor whether the new parking system works properly or not. But a clear visible video system might be also very helpful for crime prevention.

European Access Point for Truck Parking Data

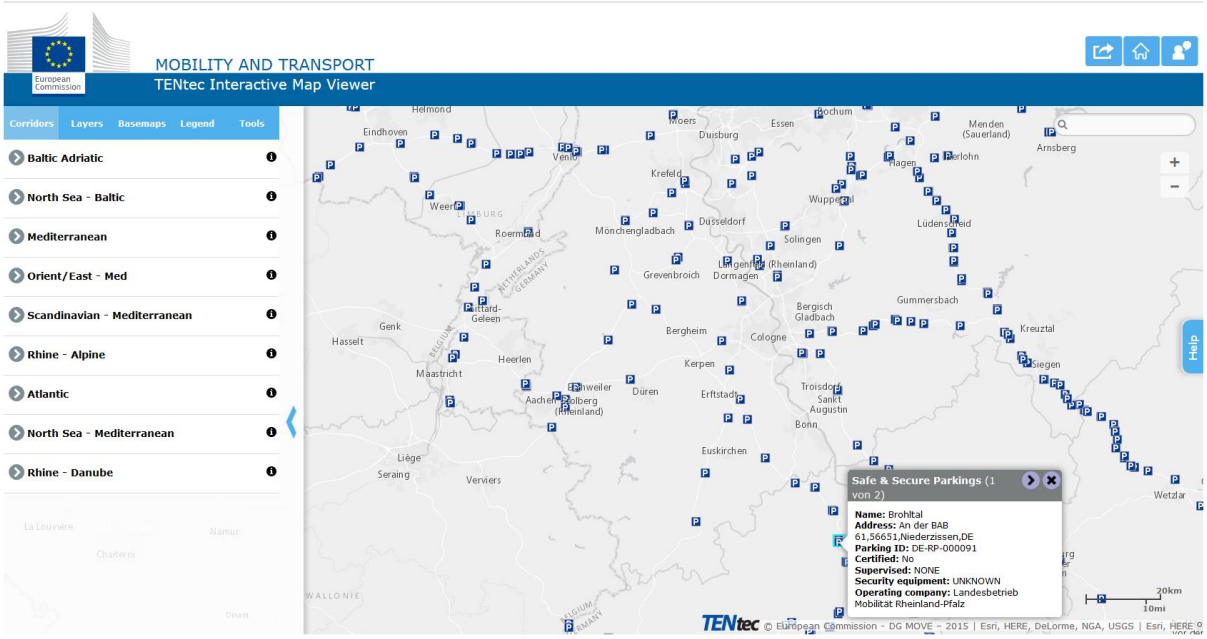
With support from the EU Member States and ITS Deployment Corridors, the EU has launched a European Access Point for Truck Parking Data. The following text has been copied from the related website of the European Commission, to be found at
http://ec.europa.eu/transport/themes/its/safe_and_secure_parking_en.htm

In accordance with Article 5 of Commission delegated Regulation (EU) No 885/2013 in the framework of the ITS Directive 2010/40/EU public or private parking operators and service providers shall share and exchange data related to safe and secure parking areas through a national or international access point. The Commission is managing a European Access Point for Truck Parking Data to enable continuity of services throughout the EU.

The European Access Point for Truck Parking aims to provide access to safe & secure truck parking data in DATEX II format. At this moment the Access Point only supports static data. The sole responsibility for data quality and the necessary updating/maintenance obligations remain with the Member States that are submitting the data to the Access Point.

All datasets are published by the European Commission on the European Union Open Data Portal:
http://open-data.europa.eu/en/data/dataset/etpa

The TENTec Portal of the European Commission is providing a visual overview of available data:
http://ec.europa.eu/transport/infrastructure/tentec/tentec-portal/map/maps.html?layer=38



3.2 Business Model

3.2.1 Stakeholders in Service Provision

As the road users are free to choose their preferred end user devices, transmission media and service providers, parts of the service chain will in many cases be provided by the private sector. Besides free services like TRANSPark, the goods vehicle driver/ haulier can get additional services and personalised information from commercial services if needed. It is expected that the amount of services available will increase, based on the growing amount of truck parking data made available at national access points as a consequence of Commission Delegated Regulation (EU) No 885/2013 of 15 May 2013 with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles.

3.2.2 Cost / Benefit Analysis

The market for truck parking information is certainly not homogenous and not well known yet. There are a number of dimensions that need to be taken into account:

- Quality requirements / minimal costs segment: this distinguishes between drivers that require a quality service and those that are driving on a minimal cost model. The (probably smaller) quality segment seeks out information about available spaces, the quality of parking services, secure parking or special required features, while the minimal cost segment will stop wherever legally required without much information requirements.
- Long-distance trip and short-distance trip segment: The long-distance driver or his company may well need a European planning facility which allows the planning of multiple stops of required quality along the route as well as real-time space availability data, while the shorter-distance trip needs only the real-time next couple of stops space availability and static national level information on truck stops and their quality (this static level already exists in a number of countries). The long-distance trip needs an integrated European service while the short-distance trip requires only a European harmonized approach.

To address the minimal cost market segment, the approach has to involve providing zero cost information on parking availability ahead, where necessary through VMS, internet and smart phone and use of this to help enforce legislation on legally available parking spaces.

There is probably a good commercial business case now for a European level 1 static parking information service, since Delegated Regulation (EU) No 885/2013 will leverage the availability of data with well-defined quality, coordinated and provided via National Access Points in a standardized format.

Real-time data on truck stop space availability (level 2 and beyond) will be expensive to provide as it requires expensive detection equipment. There is little commercial business case to procure this in the private sector, although again there is one for exploitation of freely available level 2 data by third party information providers. Level 2 will therefore only be possible with public investment, which will be available only if the socio-economic case is strong enough at a local level (mainly driven by road safety considerations of illegal parking and tired driving caused by a lack of parking capacity).The socio-economic case will differ based on the truck parking-related problems that are found in each country.

3.2.3 Vision for the future

In the future it is likely that booking facilities will be offered increasingly by private service providers. Those facilities will enable goods vehicles drivers and hauliers to reserve a parking space in advance. The following services could be imagined:

Provision of possibility for automatic rescheduling (based e.g. on actual traffic management measures)

Information on truck parking area locations and amount of total parking spaces is provided via the internet. Additionally, information about the currently free parking spaces, as well the already booked ones, is available.

In case of a delay in time (caused by congestion, break-down, bad weather conditions, e.g.) the vehicle's On-Board Equipment (OBE) automatically calculates that the estimated arrival time cannot be achieved. Based on the prevailing traffic conditions and the remaining allowed driving time, the system automatically releases the already reserved parking space and books another parking area with free parking spaces. The OBE runs partly to manage the trip of the truck driver and will assure that the truck drivers respect all driving regulations.

As it is possible to reschedule the parking space during driving, this service level is not only pre-trip.

4 Annex A: Compliance Checklist

4.1 Compliance checklist "**must**"

#	Requirement	Fulfilled?		If no – quote of insurmountable reasons
		Yes	No	
Functional requirements				
FR1	Functional decomposition and the provision of standardized interfaces **must** be carried out to ensure interoperability in cases that the service is carried out by more than one organisation [see picture above].			
FR2	The data provided for static information **must** be based on a consistent and geographic reference mode, which **must** be part of data description.			
FR4	The basic static information **must** be offered: • Location (basic information) • Location (latitude/longitude) • Primary road identifier (road class)/direction (upper target goal) • exit/distance from primary road • name, address			
FR6	The data provided for dynamic information if available **must** be based on a consistent and geographic reference model and a time validity model, which **must** be part of data description (see above).			
FR7	The geographical basis for dynamic information **must** be the same or compatible as the one for static information.			
FR10	Source, scope and quality of data provided by data owners to service providers **must** be defined and **must** be part of data interface description.			

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. These parties and their role in the organisational structure of the ITP-service demand special attention and finally agreements/ contracts.			
OR2	Contracts/agreements **must** be established, which set up the rules of cooperation.			
OR3	Collaboration processes/workflows and interfaces **must** be described.			
Technical requirements				
TR1	To foster interoperability between different actors involved in the traffic information chain DATEX II profiles for static and dynamic information **must** be used.			
Common Look & Feel requirements				
CL&FR1	Information for the end user **must** be consistent, whatever media or end user device is used for distribution.			
Level of Service requirements				
none				

4.2 Compliance checklist "**should**"

#	Requirement	Fulfilled?		If no – explanation of deviation
		Yes	No	
Functional requirements				
FR5	Advanced static information about the parking area type **should** be offered if available: • truck only/"combined" parking facility (including non-goods vehicle) • number of spaces for trucks (defined by operator) • number of spaces for cars, busses (defined by operator) • fee or not • features and services for dangerous goods/refrigerated goods vehicles/abnormal goods • service features (facilities, fuel card, security, LABEL European standard certification scheme for truck parking areas)			
FR12	The geographical area of information dissemination **should** take into account the characteristics of the information transmission channel used.			
Organisational requirements:				
OR4	The information provision **should** be in accordance with any management plans which are in operation of the road authorities or traffic management centres.			
Technical requirements				
none				

Common Look & Feel requirements				
CL&FR2	The display of signs/pictograms on VMS or other end-user devices **should** be in accordance with prevailing national road codes and in line with the requirements of the EW-DG for Variable Message Signs Harmonisation VMS-DG01 and VMS-DG02: • MS who ratified the 1968 Convention MUST respect the 1968 Convention and SHOULD consider the Consolidated Resolution on Road Signs and Signals (R.E.2); • MS who did not ratify the 1968 Convention SHOULD follow the 1968 Convention and also consider the R.E.2.			
Level of Service requirements				
none				

4.3 Compliance checklist "**may**"

#	Requirement	Fulfilled? Yes	Fulfilled? No	If yes –remarks
Functional requirements				
FR3	The geographical basis for static and dynamic information **may** be left to the involved partners to define.			
FR8	The dynamic information **may** include the: • availability of the truck parking areas based on the occupancy • current number of free goods vehicle parking spaces.			
FR9	Historic dynamic information data **may** also be required for algorithms or forecast.			
FR11/13	To foster interoperability between all parties involved (content providers/non-technical sources, service operators, service providers) the sub-function **may** provide the following interfaces conforming to the following event information structure: • static information • dynamic information • comment (free text) • information source			
Organisational requirements				
None				
Technical requirements				
None				
Common Look & Feel requirements				
None				
Level of Service requirements				
None				