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Study regarding secure parking places for trucks and commercial vehicles, telematics-controlled parking and reservation systems

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M A N A G E M E N T S U M M A R Y

On 16 December 2008 the European Commission adopted an ITS Action Plan (COM (2008) 886) for road transport and interfaces with other modes. One of the key priority areas involves **road safety and security**, and the scope of this study falls within that priority area.

The general objective of this study is to provide support on the subjects of secure parking places for trucks and commercial vehicles, and on telematics-controlled parking and reservation systems.

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1. Introduction to the report

1.1. Context

A number of problems and emerging user's needs are affecting truck parking areas on the European road network leading to emerging ITP services.

- a) over-crowding of some truck parking areas at specific peak times leading to dangerous parking (e.g. on motorway slip roads or dangerously within sites) and driving beyond statutory driver stop time limits
- b) extensive freight crime leading to large economic losses
- c) increasing market requirements for a higher level of truck parking service in certain market segments (e.g. high value goods, dangerous goods, long-distance trucking)

1.2. Objectives of the Study

ITS-based road safety and security applications have proved their effectiveness, but the overall benefit for society depends on the scale of their deployment. Efforts to promote best practices in these areas are therefore crucial to address these issues.

The study was structured around two tasks:

A. **Synchronisation of past and ongoing activities** in the field of Intelligent Secured Truck Parking (ITP). This synchronisation aimed at:

- § Filling possible gaps between these activities
- § Giving advice to guarantee a harmonised design and functionality of the information provision
- § Defining measures to optimise existing parking areas and their cost/benefit ratio

European projects addressed were SETPOS, LABEL and a part project of EasyWay, with regard to:

- § Infrastructure measures to increase security
- § Costs per categories of investment
- § operational costs for the different service layers of parking areas
- § telematic-control of parking areas and displaying the occupancy rate via VMS or directly to the OBEs of trucks or through other methods
- § various service categories (inventory, display of information, reservations possibilities)
- § optimising existing parking areas

B. Analysis and propositions for a harmonised Information System at a European level. The analysis was focused on seamless cross-border display of occupancy of Truck Parking Areas (TPA).

This task consisted in:

- § Elaborating the most efficient concept for dispatch of information for available parking lots. This activity was linked with the study "open in-vehicle platform architecture for the provision of ITS services and applications".
- § Assessing the effects of reservation systems in regard to an optimal use of parking areas.
- § Elaborating a business model to guarantee harmonised European approach and seamless cross-border information and reservation. The proposed model had to specify the form of the organisation (purely public, PPP or other).

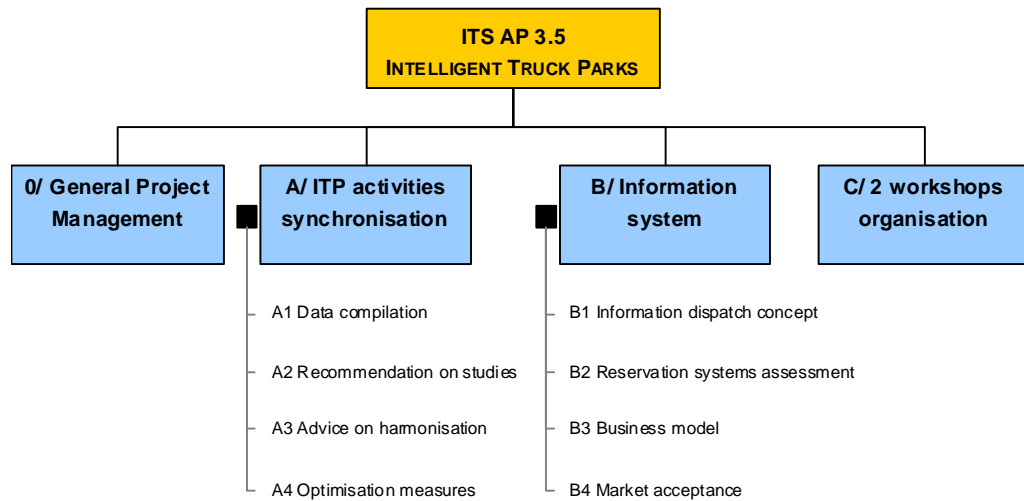
1.3. Scope and objectives of the Final Report

This report includes the outcome of both tasks, including the results of the stakeholder consultation.

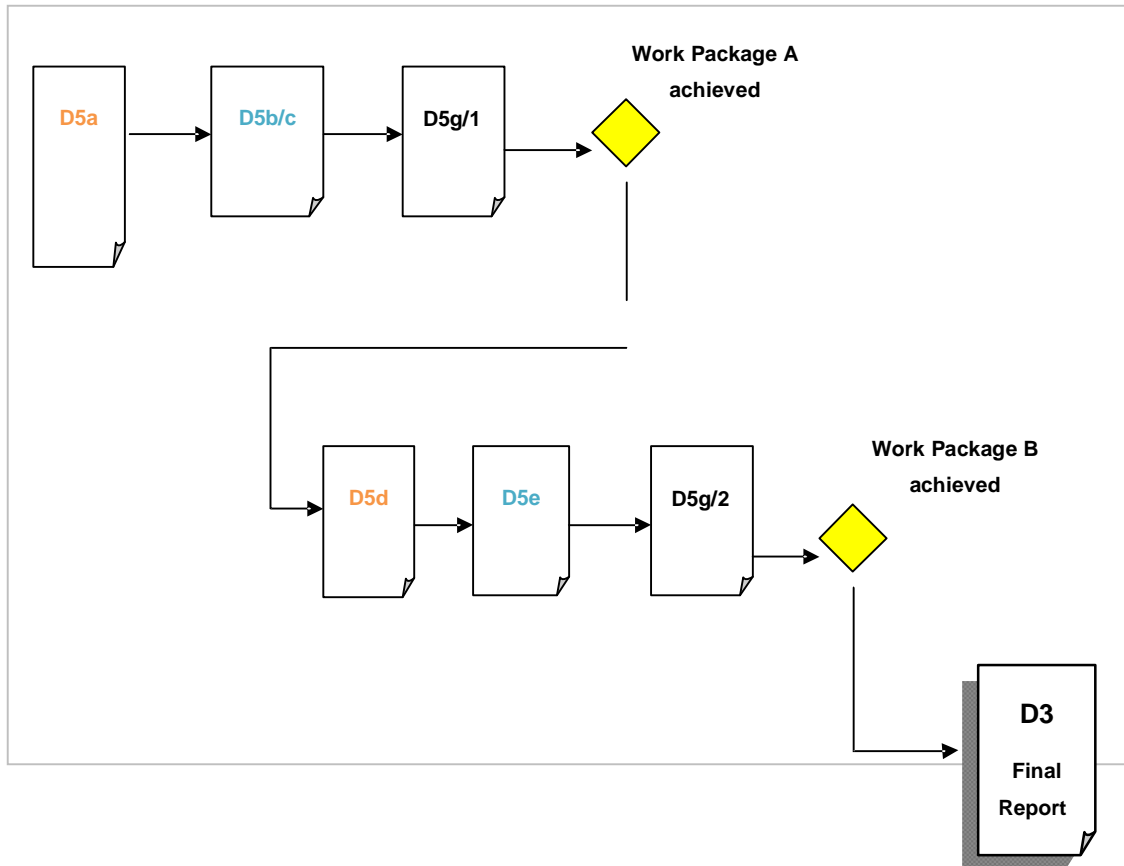
The third and ultimate part of this document justifies the advancement of the study for each specific issue addressed and identifies the next steps to go further on these subjects.

1.4. Methodology

1.4.1. GENERAL STRUCTURATION OF THE STUDY



1.4.2. DELIVERABLES PRODUCTION PROCESS



List of deliverables:

- D5a - Data Compilation Report
- D5b/c - Bridging completed and ongoing studies in the relevant field and advice for EC on information provision and optimisation of existing truck parking areas (TPAs)
- D5d - Concept for information dispatch and assessment of the effects of truck parking reservation services
- D5e – Report on a feasible business model for a information/reservation system for trucks and market acceptance survey

Each report contains a specific list of sources.

2. Data compilation

2.1. EU projects addressing ITP

Three EU-funded projects address ITP: EasyWay, LABEL and SETPOS.

2.1.1. EASYWAY

EasyWay is a European ITS deployment project on the TEN-T network, co-funded 20% by the EU from the TEN-T fund which started in 2007. It is currently in phase 2, which began at the end of 2010.

EasyWay includes member state deployments of a number of dynamic information systems on truck parking space availability and secure parking areas, mainly in Germany, France and Italy (where it seems there are serious capacity problems) as well as a number of feasibility studies in other countries.

A key part of EasyWay are also the European Study groups, which are supposed to help to harmonise European deployment of ITS. In the Freight and Logistics Services European Study group, there is a key sub-group on ITP which has developed deployment guidelines which give high level instruction on how to deploy truck parking information services including defined levels of service. In 2011, these guidelines are being extended to include secure truck parking.

The ITP group is also currently promoting a standard level of member state engagement in truck parking data provision. Besides, this group is pushing for the inclusion of ITP data in DATEX II and development of harmonised VMS symbols for truck parking information.

The ITP group has also conducted a number of best-practice and stakeholder workshops examining issues of cooperation with truck parking area operators and information providers and special days on DATEX II extension and VMS harmonisation.

The **EasyWay ITP guidelines** provide advice to implementing bodies on how to set-up their projects in such a way that a harmonised European service can develop. They present levels of service, a common service concept and a work plan for achieving the required agreements, standards, and data collection structures.

2.1.2. SETPOS

SETPOS is a 50 % co-funded research and demonstration project of the EU, which finished in 2009 and demonstrates a number of projects in the ITP field. As mentioned by Jonathan James (Director of the Sustainable Transport Group at AECOM), in his workshop presentation (EU ITP workshop in Brussels, June 2010), the SETPOS main objective is to answer to a lack of adequate secure rest facilities for drivers. It aims to involve widespread alliance of partners across Europe, active in freight and security industries. The project included the following main tasks :

1. Building and evaluation of 5 secure parking demonstration sites (either new builds or upgrades of existing facilities)

New build	Truck Etape, Uhrleben, VPpneus
Upgrade	Ashford, Womitz

2. Definition of three levels of truck parking security standard
3. Establishment of an information, guidance and reservation platform for all types of truck parking
 - § Service 1: An integrated information online database about (secure) parking sites in Europe free of charge to end users.
 - § Service 2: Information about available slots at (secure) parking sites.
 - § Service 3: Pre-booking option of slots in parking areas.

2.1.3. LABEL

This is a recently completed EU co-funded research and demonstration project aimed at establishing a certification system for Truck Parking Areas (TPAs) for the following categories: security, safety, comfort & dignity and food & shopping.

LABEL claims the following characteristics:

- § LABEL accesses existing approaches. It carries over findings from the project SETPOS and reviews input from outer sources. LABEL moves on from these sources to generate a European standard certification scheme

that is to be recognised by: certifiers, insurers, public authorities, motorway operators, shippers, forwarders, carriers and truck parking area operators.

- § The LABEL scheme consists of security and quality requirements with a multi-level ranking and provides a complete European “Blue Flag” scheme. The project also works out certification rules and guidelines based on which a quality stamp can be provided.
- § The “practical” objective of LABEL was the actual certification of at least 50 truck parking areas in at least 10 EU member states.

2.2. Truck parking problem issues, user needs

A number of problems and emerging users needs are affecting truck parking on the European road network including:

§ **Over-crowding of some truck parking areas**

It is caused by:

- § high recent growth in truck traffic not matched by growth in truck parking capacity,
- § a reduction in the maximum working week of truck drivers,
- § strict statutory driver stop time limits

Truck over-crowding at parking stops leads to:

- § dangerous parking within (off normal allocated spaces) and outside of the truck parking area (overflow onto motorway entry slip lane), which can lead to serious accidents on slip roads and safety risks within truck parking areas,
- § driving beyond statutory driver stop time limits in order to find a truck parking area with free spaces (although drivers generally tend to park illegally rather than drive illegally as the latter is more thoroughly enforced) and thus tired driving.

§ **Freight crime**

Freight crime is perceived to be a major problem across Europe and is estimated to cause billions of Euros¹ of commercial damage every year and many assaults, particularly for high value loads. Aggravating causes include a lack of security at truck parking areas.

Incidents of truck crime occur in different types of locations: *En route*, at non-secured parkings, within facilities and at Secure parking spaces (unusual).

¹ NEA estimates en route yearly freight crime of 8,2 billion Euros in the EU

The major foreseen solution is to increase the number and quality of secure parking services, because the availability of secure parking spaces across the European road network remains, at present, the biggest challenge.

§ **Increasing market requirements for a higher level of truck parking service**

Most truck operations work on a highly competitive cost model and are not willing to pay for “non-essential” services, for example shower facilities and toilets. However, there is a growing, but still niche, market for a higher level of services regarding security, comfort and space reservation and information. This market is complex because demands vary in function of the types of load and trip, and driver habits.

2.3. Public policy priorities and emerging ITP services

2.3.1. OVERCROWDING OF TRUCK PARKING AREAS AND ITP SOLUTIONS

From a public policy point of view, overcrowding of truck parking areas is an important issue as it can possibly involve high external accident costs and potential solutions require public sector coordination and significant investment which may not be coming from the private sector.

Apart from building new parking spaces, other possible solutions to this issue include the following ITP services

- § Improved general information about truck parking area
- § Parking places reservation
- § Optimisation of the utilisation capacity of existing sites

2.3.1.1. TRUCK PARKING INFORMATION AND CENTRAL RESERVATION SERVICES

Search for information on truck parking areas

There are 2 on-line European TPA information search portals currently operating, TruckInform (operated by MoveandPark and a product of the SETPOS project) and TRANSpark (operated by the IRU and supported by the IRU and ECMT) which use different datasets and data structures. There are also a number of national websites.

TRUCKinform website covers 2600 TPA and offers three layers of free service: static general information on these TPA, dynamic information on occupancy and booking.

TRANSpark platform is an Internet interactive application to register and search information covering about 2800 TPAs around 42 countries.

Although similar, both have different databases data structures and pictographs and different web operating styles. At the ITP workshop, Peter Krausz emphasised the fact that data collection on TPAs has been a major issue for years now.

The EasyWay project could facilitate the initiation of the data structure harmonisation effort, possibly by including the recommendations of the LABEL project, which define a service classification system of truck parking areas including dignity and security features.

Dynamic information on truck parking space availability

The aim is to avoid illegal parking and illegal driving over stop time limits, by giving drivers a chance to plan their stop at sites where they know there are free spaces within legal limits as well as providing information for orientation within complex parking sites.

This service is provided largely by road operators on VMS signs on the road network, but can be sent to the web, to personal and in-vehicle devices. Data is collected on the parking site using various technologies, which either count the vehicles coming in and out or count each parking place occupancy directly.

The key questions surrounding this service are how to plan for and justify investment in the service from place to place, how to make drivers respond to it and how to fund it, as it seems that it is not a service with full commercial viability.

There are two basic methods of HGV detection that have been trialled: direct detection of the slots themselves or counting vehicles in/out of a parking area. EasyWay guidelines mentioned the development of other innovative detection systems currently, especially in Germany (inductive loops, bay detection).

EasyWay ITP information services harmonisation issues

The EasyWay ITP deployment guidelines define the following key harmonisation requirements for truck parking information and reservation services:

- § Basic implementation concept
- § EasyWay Levels of service in parking management (3 levels)
- § EasyWay Levels of service of information provision and reservation (5 levels)
- § Quality of data
- § Standards and agreements
- § Harmonisation of ITP signing and pictograms
- § Data exchange between operators

The market and business case for truck parking information services

The market for truck parking information is by no means homogenous and there are a number of dimensions that need to be taken into account.

Quality requirements / minimal costs segment: to address the minimal cost market segment, the approach has to involve providing zero cost information on parking availability ahead where necessary through VMS and/or subsidised push SMS services.

Long-distance trip and short-distance trip segment: there is probably a good commercial business case for a European level 1 static parking information service as long as there is good quality data available coordinated and provided for free by national public sector coordinators in a standardized format. Most truck stop operators will provide data on their facilities voluntarily as it is in their own interest.

The level 2 (and above) real-time dynamic data on truck stop space availability will be more expensive to provide as it requires detection equipment. 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. The socio-economic case will differ based on the truck parking related problems that are found in each country.

The whole market is however developing in a highly competitive environment with a low willingness to pay for services.

Truck-stop central reservation services

Such a reservation service at one portal entry point allows reservation, and potentially pre-payment, of a truck parking slot. Current reservation services are mainly for secure parking and truck parking area capacity enhancement sites.

In addition to the free limited TruckInform service, there is one emerging dedicated pilot commercial reservation service bringing together more sites operating in Germany called Highway Park.

The market for reservation services is still quite small in reality: a study from the Hamburg area² showed that only 3 % of drivers planned their stops as part of a route planning decision while 91% of them indicated that they would appreciate a reservation system. To conclude, there are relatively few bookable sites in Europe (no statistics are available).

Some of the key questions surrounding a centralised truck stop reservation services include the following

- § Is there a real market for such a service given the low number of such truck parks?
- § Is it essential to tie it in with an on-line truck search service?
- § Is there market for a pre-planning service, for an on-trip service or for both?
- § Does it need to be automated so that access to the site requires no more communication with the parking operator?
- § Do we need a single reservation web site at the European level?
- § Is there any justification to financially support such a service from public money, will it help secure parking be more attractive?

2.3.1.2. TRUCK PARKING AREA CAPACITY ENHANCEMENT

² EASYWAY - ITP Workshop in Koblenz 2009 - Truck drivers, unknown partner – anymore?

Capacity optimisation involves setting up a time-in/time-out slot system (drivers know their schedules) and automatic barriers with a counting device. This allows first-in - first-out “end to end stacking” of trucks, which can roughly double the available capacity of the truck parking area. This approach has been pioneered in the last couple of years by Germany and was co-funded through the EU TEN-T fund (TEMPO, EASYWAY) and a number of further locations are planned to be rolled out.

A Telematics-Controlled truck parking (TCP) pilot system was installed on the German motorway A3 at the service and rest area “Montabaur” in 2008, as part of EasyWay. The implementation of TCP enables a complete re-design of the parking area with an optimised usage. In this case, the system doubled the capacity of the parking and the user acceptance was positive.

The implementation of a TCP system is less expensive than a constructional extension. Costs of about 10,000 to 15,000 € per additional parking space can be calculated.

Innovation in capacity optimisation is proactive as demonstrated within the first ITP workshop, by the recent “Intelligent Compact Parking” concept, developed by the BaST³ in 2009.

2.3.1.3.

2.3.2. FREIGHT CRIME AND SECURE PARKING SOLUTIONS

Two ITP initiatives are led in order to deal with this problem:

- § Implementation of a Secure truck parking network
- § Certification of levels of TPA services

2.3.2.1. IMPLEMENTATION OF A SECURE TRUCK PARKING NETWORK

There is little hard evidence of a shortage of high security truck parking spaces in terms of market demand, but freight crime is perceived to be a socio-economic problem in most countries.

Some countries such as Italy already have national support programmes for high secure parking; others do not and leave it to the market (e.g. UK, Germany). Other countries are

³ German Federal Highway Research Institute

developing or have developed strategies focusing on tackling freight crime and secure parking in a wider sense UK, Holland).

In an attempt to stimulate the development, use and insure industry recognition of secure parking, five “new generation” high quality pilot secured parking sites have been supported with EU co-funding within the SETPOS project and within EasyWay. Such paid secure truck parking areas address a niche market because truck operators demonstrated a very low willingness to pay for it, in a very price competitive market (insurance benefit, spendable vouchers).

SETPOS Standards

SETPOS standards have been developed to define secure parking and provide different level of services for secured truck parking. The standards have been designed to set a series of objectives relating to security measures. In theory, these standards, once certified at a site might motivate the insurance market to offer reductions.

Fundamentally there are two main standards defined:

- § SETPOS Secure sets the minimum reasonable requirement for physical security
- § SETPOS High Security is the Europe wide, high standard for truck parking security offering access to anyone arriving and willing to pay the admission fee.

SETPOS Special Security is an addition to SETPOS High Security with a higher degree of security.

Business case for implementation

SETPOS offers generic business case advice and a spreadsheet tool to help develop a business case for a secure truck parking. The SETPOS guidance, however, offers only the skeleton of a cost model without unit costs.

As confirmed by Jonathan James, during the first ITP workshop, insurance companies could greatly enhance the business case for operators to build and for drivers to use secure parking.

Except the French insurance company AXA, in general terms, insurers across Europe do not yet recognise parking practices in the design of premiums.

One of the keys to make progress on the insurance issue is industry acceptance, standardisation and commercially enabled certification of the security levels of truck parks.

2.3.2.2. *CERTIFICATION OF LEVELS OF TRUCK PARKING AREA SERVICE*

This topic is addressed by the LABEL project which aims at establishing a certification system for Truck Parking Areas (TPAs) for the categories security, safety, comfort & dignity and food & shopping with a broad acceptability in the EC.

LABEL outputs are a key input in defining a standard static information database on truck parking (i.e. detailed level of information on truck park characteristics) and in potentially gaining wide acceptance of the SETPOS security standards by the insurance industry. This in turn may drive the market for secure parking.

Certification will be carried out by qualified auditors, based on a cost efficient realisation of the audit.

A risk assessment methodology will be formulated for the optimal security level of a certain TPA related to the crime level of the region in which it is located.

Business case and evaluation of certification system

In order to determine the validity and improvement potential of LABEL, it is necessary to assess the cost-effectiveness of LABEL and evaluate the acceptance by different stakeholders.

The Evaluation process needs to assess the economic impact of LABEL (certification, information resource on Internet, etc.) from the point of view of the road transport industry.

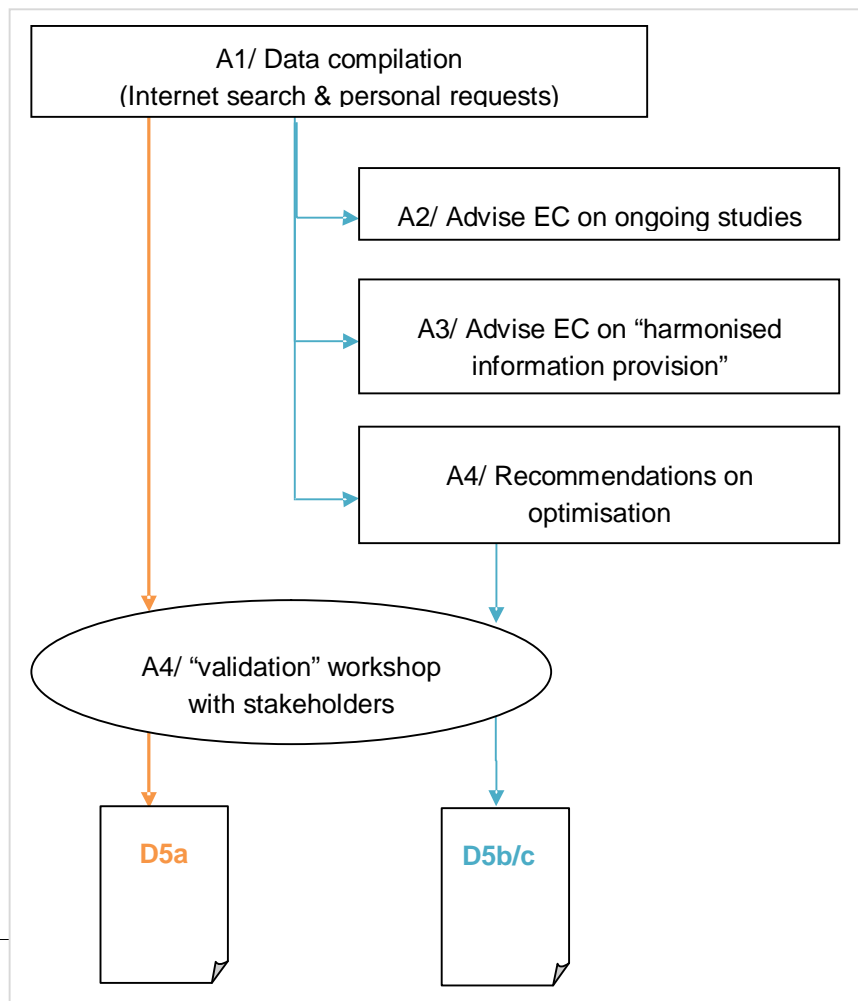
3. ITP activities synchronisation

3.1. Objectives

This part of the Study consisted in:

- § formulating recommendations for the ongoing studies financed by the Commission and identifying measures to support/advise the Commission, by filling possible gaps, in order to avoid duplication of work,
- § giving advice on how to guarantee that the so-called "harmonised design and functionality of the information provision" is understood in the same way,
- § defining measures to optimise existing parking areas and their cost/benefit ratio.

3.2. Methodology



3.3. Results

3.3.1. ISSUES ANALYSIS

3.3.1.1. SEARCH FOR INFORMATION ON TPAS

Market, business case and user acceptance

The limited evidence available suggests that pre-trip planning information is appealing mostly to the niche market of very long-distance trips with specific parking needs (e.g. higher comfort needs, secure, special parking).

If provided on-trip, in a standard format through for example mobile-phones, PDAs, RDS-TMC or navigation devices, detailed (even static) information could be of more use at an on-trip operational level for those with such equipment

ITP workshop discussions indicated that knowledge of the market is indeed limited and perhaps more complicated than the limited evidence suggests.

Technical solutions, harmonisation issues

§ **Technical harmonisation of data model to create a public data set**

No single standard currently exists, not even a detailed concept of such a standard, although a number of practical and similar data structures exist in several projects.

In any case, it is of key importance that such a standard is developed in a consensual way addressing all the key industry stakeholders.

This data structure then will need to be integrated and harmonised into other processes and structures such as DATEX II, which is guided as part of the EasyWay project.

§ **Technical harmonisation of data sharing in a European truck parking “dataset”**

EasyWay so far inclines towards member state / road operator control of their parking data sets, with some data sharing arrangement and an intention to involve DATEX II for traffic management of relevant truck parking data. SETPOS / TRUCKinform has shown an ambition to control the European information

service and a full truck parking data-set within a proprietary set-up, but this goal remains unrealised so far because an obvious “business model” justifying high quality data and a complete data set remains lacking

EasyWay clearly identifies a distributed approach with road operators’ involvement as the only practical way forward for collecting a good quality data with the help of ministries and road operators where necessary, and in our view this is backed up by the negative experience so far of TRUCKInform in this respect.

Organisational solution, legislation issues

The key organisational issues we observe are: how to provide a harmonised European service, which involves issues of public and private roles in data collection and provision; and how to improve cooperation of parking operators in providing data.

To develop a high quality European truck parking information service(s), a model of potentially multiple information service providers using a single European public dataset seems the best and most realistic option.

The challenge has two key aspects. :

§ **How to ensure the participation of member states, road operators and parking operators in providing the data?**

Member states / road operators could in some cases enforce a contractual obligation or bonus clause for operators to provide clearly defined TPA information to a central source.

Another possibility is to require member states to legislate for the obligatory provision of data on truck parking in a standard format with a given frequency to a central authority.

Neither EasyWay nor SETPOS offer, as of yet, any clear answers to the issues of organisational management of a full coverage quality dataset and legislative solutions to enhance the data quality.

§ **How to build, maintain and provide the “dataset” at a European level?**

< re: an answer seems lacking in the report >

3.3.1.2. DYNAMIC INFORMATION ON TRUCK SPACE AVAILABILITY

Market and business case

It seems from the limited evidence available that most truck companies are not willing to pay for truck parking services or information services.

Therefore the costs of data collection and VMS transmission (circa 2-4 thousand Euros of investment per parking slot) will almost certainly have to fall on the side of the public sector.

This service is primarily a concern of road authorities, and should be based on a socio-economic business case. If this data can then be provided for free or at low cost to European truck parking information service providers, they will find a way to integrate it into their truck parking information services.

Technical solutions, harmonisation issues

§ **Technical harmonisation of data collection and sharing**

EasyWay so far inclines towards member state / road operator control of their parking data sets with some inter-country data sharing arrangement and an intention to use DATEX II for data sharing while SETPOS TruckInform has shown an ambition to control the European dynamic information service within a proprietary single database set-up.

Although the TruckInform dynamic truck parking availability information system is not really operational due to the lack of willing data sources, the xml based web-interface idea allowing easy data access for third party information suppliers and data link-in by parking operators is an interesting idea for use by TMC/TICs even for a more decentralised system as envisaged by EasyWay.

The ideas of getting occupancy estimate data from parking area wardens through SMS or web entry are interesting from the cost point of view (possibly cheaper than automated systems, a CCTV set-up might be sufficient) but could clearly only work if the wardens were obliged to do this contractually or somehow incentivised.

EasyWay decentralised approach is probably the most realistic one, particularly as public sector organisations are likely to pay for the data and will drive the data coordination process.

A major question though is whether there is a need for a European technical interface linking all the TICs/other truck parking data sources which would make data access easy for a potential supplier of a European service on dynamic parking data.

§ Levels of information service in parking site management

EasyWay levels of service do not (yet) define the required quality of data, mainly the frequency of update and the reliability of the real-time information. Quality, however, is a key element of a standard of service.

§ Levels of service of dynamic information provision

The levels of service for dynamic data make overall sense and the added value of each of them is clear.

The levels of service however may also appeal to different market groups and level 2 may not constitute something better than level 1 for all cases.

EasyWay levels do not define quality standards for the data such as coverage, update frequency, reliability etc. This is certainly necessary for a meaningful level of service.

Organisational solution, legislation issues

Dynamic information on truck parking availability is not a service that is required for every TPA and due to the likely lack of a direct commercial business case, this detection and VMS provision will most likely be funded by member states through their national (or concession) road-operators.

It is necessary to make sure that quality data is available for all sites where such data is needed and that the data is available to all other road operators and suppliers of information on truck parking using different media, particularly on-board and personal devices.

Such data availability could be achieved by building the dynamic data into a distributed European system of traffic information based around the DATEX II standard and the core network of TMCs and TICs around Europe.

3.3.1.3. TRUCK PARKING CENTRAL RESERVATION SERVICE

Market, business case and user acceptance

There is interest in providing such a European booking service by some private booking providers and truck parking operators or private road concession operators at high quality TPAs, many of which offer high security parking.

One key to the success of the Highway Park service was apparently the option to pay with fuel cards as this made the invoicing process much easier.

Reservation systems would be very welcome by drivers but truck operators are, in general, not willing to pay. According to SETPOS, the cost of enabling reservation systems at TPAs (and in particular automating from the web site which require automated gating) is quite high and the business case it seems is still limited.

Technical solutions, harmonisation issues

§ **Technical requirements of an harmonised and integrated reservation service**

Any operational and successful central reservation service needs to accommodate a whole set of parking sites functional set ups and needs to allow convenient payment. This is indeed the case with Highway Park, where truck terminal information is administered by the leaseholder himself.

The cost of more sophisticated booking options is a barrier and many parking operators will not see the business case to have any expensive communication, payment equipment and software unless they need it for other purposes.

In regards to the interface with the user, to enable pre and on-trip access, the most important aspect of "harmonisation" is to ensure the possibility to book and pay from a whole number of different access points and modes. This is best served by offering a whole range of pre-pay, post-pay, on-site pay and different booking options (sms, phone, on-board computer, on-line web form interface).

§ **Technical harmonisation of reservation data structure and data exchange**

Aspects of reservation would need to be included in a standard TPA attribute dataset including for example the possibility to reserve at all, centrally on-line or not, number

of total / currently available bookable places, and all payment and entry access options.

The provision of dynamic information on the number of available bookable spaces could be harmonised by the use of DATEX II and TMC/TICs and possible extension of communication protocols such as Alert-C. A question remains however whether dynamic bookable space availability is really transport management critical information which belongs in the TMC environment.

§ **Technical harmonisation of levels of information service**

A simple harmonisation level is proposed in the EasyWay project Level 5: Provision of facilities for booking. This is a general single definition and a whole separate sub-set of reservation levels of service including payment and media options could be defined if (and only if) reservation services are really considered a central part of a European truck parking service.

Organisational solution, legislation issues

A model of potentially multiple central reservation providers using where appropriate a single European public dataset on truck parking areas as a base seems a realistic and beneficial model most aligned to public policy interests, while a single central public system seems unnecessary and difficult to setup and operate in organisational terms.

Such a model would allow reservation providers to operate on a commercial basis with the ability to draw on the single information database on truck parking sites. This option seems initially to be the most practical and most aligned to public policy interests.

3.3.1.4. TPA CAPACITY ENHANCEMENT

Market, business case

This is an operational system that probably reduces the cost of parking space provision and can increase capacity without the need for extra land. Therefore it is of clear interest for both public sector and private parking providers. By providing barriers and detection equipment, it also greatly reduces the marginal cost of providing dynamic information about occupancy and introducing automated reservation facilities, so it is also a catalyst for such services where they are required.

Technical solutions, harmonisation issues

Basic technical components include:

- § a parking terminal,
- § a barrier at the entrance to the parking area,
- § data transfer to dynamic signs at the motorway and to information services for HGV drivers (internet, OBU, routing systems).
- § (ideally) magnetic field detection devices of slots for technical feedback on actual occupation of spaces.

The current system can only be applied on parking facilities where HGVs are completely separated from other vehicles.

Given that the service is local in nature, there is no major harmonisation requirement beyond clear guidelines on functionality and required detection capability to make the service reliable and to ensure the technical link into the provision of dynamic occupancy data.

These TPAs will provide valuable information to a European truck parking data set and even potential reservation system (see chapters 4, 5 and 6) as they automatically provide dynamic information on their occupancy.

Organisational solution, legislation issues

This is an innovation which is attractive both for public and private truck parking operators, which is locally implemented. No major motivation should be required to use this measure, but information on the technical solution is required.

This is essential to follow an integrated approach: smart ITP capacity enhancement has to be implemented in complement with new HGV spaces building and ITP information services.

EasyWay has considered including this methodology in its guidelines.

3.3.1.5. SECURE TRUCK PARKING

Market, business case, user acceptance and policy support

The SETPOS and EasyWay projects give some comparison on the overall budget for projects, the technical equipment and the corresponding security level, the pricing schedule and some limited evaluation. However, there is no comprehensive documentation of the entire secure parking market across Europe and financial viability.

The creation of high security parking sites throughout Europe by private companies (e.g. in the UK, Germany and France) proves that some private market exists. Such paid TPAs address a niche market, and if offering new places, can offer the complementary benefit of additional truck parking capacity in locations where capacity is scarce (if this is located where it is most needed).

The location of any TPA is of key importance to the commercial viability of a secure parking area. Ultimately, if a development is not well located on the road network it will struggle to compete and stay open. However, the stand-alone business case is far from being guaranteed even if a secure park is well located and cost minimisation is essential.

SETPOS offers generic business case advice and a spreadsheet tool to help develop a business case for a secure TPA with advice on how to plan and market an implementation and gives an outline detailed cost and revenue structure without providing any unit costs. The need to do proper market analysis prior to proposing the location, dimensions and services of the site is the essential message of SETPOS.

Given the large range of additional costs documented by the data compilation report, a very detailed and sophisticated guidance model would be required taking into account a large range of external and starting context factors, which influence cost. To build such a model is not impossible but required extensive research into the cost structures of existing sites and their contexts.

In the case where the high security “market” is smaller and the risk is lower, the commercial case is less clear. However this does not mean that such parking may not warrant public financial support if the socio-economic case can be proved.

To boost the overall business case, such areas might need to be strategically developed into at a network of locations to ensure full trip access to secure truck parking for truck operators, especially those engaged in long journeys across Europe. Such a network could help to stimulate the insurance market, by providing a high security guarantee for the whole trip. Such a network cannot be commercially coordinated without public policy support for developing targeted locations at the national and European levels.

A further factor which may stimulate secure parking and insurance packages is a labelling and certification scheme such as has been developed in the LABEL project.

In addition there is interest in increasing TPA security across the whole range of parking sites including layout and visibility at less secure normal public sites.

A number of countries are beginning to understand that more policy and where necessary funding support is required and that it is not just a task for the private sector.

Technical solutions, harmonisation issues

§ **Secure parking standards**

It is likely that secure sites throughout Europe will have different technical standards and some improvements on the SETPOS standard. As SETPOS standards include technology elements, there is a risk that they become obsolete rapidly and no longer significant. To avoid this situation, it may be interesting to study another way of defining standards, without too technical elements, but based as much as possible on functionalities.

Organisational and institutional issues: insurance and certification

There is a general perception that many trucks at risk do not use high security parking because of the absence of commercial interest or other incentives to pay.

There is almost no insurance premium benefit and freight operators are not willing to pay extra costs in a very competitive market.

Even if insurers across Europe do not yet widely recognise parking practices in the design of premiums, the goal is that all insurance companies in Europe promote secure truck parking with incentives for transport companies to use secure TPAs. As recalled during the ITP workshop, the success of ITP consists in transferring the cost from road operators to service providers.

One of the keys to making progress on the insurance issue is probably industry acceptance, standardisation and enabled certification of the security levels of TPAs, which is addressed in the LABEL project.

It is not yet clear how important independent certification is for the insurance industry and whether the certification costs will be acceptable to truck operators. It is possible that self-

certification with the option of insurance company audit may suffice or that certification will just be made by truck parking data providers as input into a European information system. This will become clear after the LABEL project concludes and implementation of the standard begins.

3.3.2. BRIDGING COMPLETED AND ONGOING STUDIES

3.3.2.1. GAPS: TRUCK PARKING INFORMATION PROVISION, RESERVATION AND CAPACITY ENHANCEMENT SERVICES

The consortium identifies lacks of:

- § Comprehensive and available up-to-date data on the attributes of truck parking areas across Europe.
- § Harmonised collection of data on truck parking space demand, capacity and capacity deficits across Europe.
- § Study / pilot evidence of the extent of social problem-solving capacity of these services, i.e. how much they address truck parking space deficits (except for the capacity enhancement service, where it is clear) and related safety issues and improve the conditions for the development of secure parking.
- § Study / pilot evidence of the extent of commercial market demand for these services although the lack of willingness to pay by most of the truck operator market is clear.
- § Sufficient study / pilot evidence of the European added value and socio-economic case for public investment in these services (despite the investment in SETPOS and EasyWay), in fact there are not even methodologies available.
- § Understanding of the conditions of reasonable requirement (when and where is it feasible, useful and economically justified) to collect dynamic truck parking availability data and use capacity enhancement services.
- § Understanding of how to best integrate (or not) static, dynamic information, reservation and capacity enhancement systems for on-line booking and information providers and parking operators.
- § Use conditions, cost-effectiveness and feasibility of different HGV detection technologies (including manual ones) in different systems to ensure optimal site parking management and occupancy information, which requires further research and development.
- § Information on the operations costs of dynamic truck parking information and capacity enhancement services (including patent use).
- § Definition of data quality requirements for truck parking data.

- § Standard data structures for a European TPA attribute data set.
- § Industry agreed technical model including standards for sharing, exchange and dissemination of data on truck parking across Europe.
- § Clear agreement on the implementation model for a standard data structure and data sharing model / interface at the European level including documented and tested organisational / contractual / regulatory models which will help ensure the free and full coverage provision of quality TPA data to information providers.
- § Harmonisation of pictograms for TPA attributes and the presentation of TPA occupancy data on VMS and in other media.

3.3.2.2. *OVERLAPS AND CONFLICTS BETWEEN THE EU PROJECTS: TRUCK PARKING INFORMATION PROVISION, RESERVATION SERVICES*

Both EasyWay and SETPOS projects have addressed information and reservation services in different ways, with:

- § EasyWay looking to build up harmonisation and standards of static information service through its guidelines and build up the TPA data-set from a bottom up perspective through member states
- § SETPOS developing a pilot European information and booking service TRUCKInform and looking to build up its own single European truck parking database integrated with a proprietary information search and dynamic availability and reservation service.
- § LABEL offering as a side product a potential standard data structure or at least part of it for the TPA attributes and also a simple classification system for quality and security.

In practice there is no obvious conflict between the approaches of EasyWay and SETPOS as regards information provision, in fact they can be complementary as long as cooperation is open. If EasyWay manages to improve the availability, breadth and standardisation of the data sources and makes this data freely available to TRUCKInform (or equally relevantly to TRANSPark), it would surely make these services much more viable and with greater impact.

A web based data interface for parking operators to enter data and information providers to source data within the TRUCKInform project is an idea which could be used within the

EasyWay model of member state data storing and provision with the use of DATEX II and TMC/TICs.

No further relationship beyond this between EasyWay and TRUCKInform or TRANSPark beyond non-exclusive agreements of cooperation is probably wise or necessary.

3.3.2.3. GAPS: SECURE TRUCK PARKING

The main gaps identified are the following:

- § The data on freight crime is not consistently documented. The yearly costs related to freight crime remain a rough estimate based on limited and inconsistent data across Europe and it is not mapped consistently in any detail. Given the evidence that there are crime hotspots and that it is a localised phenomenon, this is insufficient.
- § The available documentation offers little evaluation about the benefits of secure parking in reducing freight crime, although it is clear that high security has a high impact. However without a good understanding of the base line crime levels, it is hard to formulate policy for prioritising high security locations. The impacts of lower security measures are not understood at all.
- § The result of labelling TruckInform sites from the LABEL projects could be useful in order to have an overview of the situation of services provided in several parks throughout Europe. But it will give a partial view of the situation, some more studies inventorying all the secure park working in Europe should be done to evaluate objectively the actual network and identify ways of progress.
- § Indicative investment and operating costs of building or upgrading secure TPAs (in particular the cost of security measures) are missing in the SETPOS guideline to be of real help for investors, however costs can vary greatly based on the size and context of the implementation. A sophisticated guidance model is required.
- § The parameters (security features, access, means of payment, services....) ensuring the success of a secure TPAs are not yet described accurately enough to guide investors toward a viable business model.
- § There is no information available to guarantee that the industry acceptance, standardisation and commercially enabled certification of the security levels of TPAs will get the insurance market to recognise secure parking in their policies and thus incentivise usage.

§ Truck parking information services providing information on secure parking do not yet have full coverage or a high enough level of data quality on secure parking.

3.3.2.4. *CONFLICTS IN SECURE TRUCK PARKING PROJECTS*

Security standards are being defined, but a divergence already appears between all the standards which have been defined (e.g. SETPOS (3 levels), LABEL (probably 5 levels, but it was always anticipated that this would supersede SETPOS), ASF parking operator has three different levels and new technologies are being developed all the time.

It is necessary to wait for the outcome of the LABEL project, but a flexible, simple and functional approach is probably required if industry accepted standards are to arise and survive.

3.4. Recommendations for further development of intelligent truck parking

The following recommendations are formulated by the present study on the grounds of the analysis of the current situation. They address all aspects of development of intelligent truck parking. The key recommendations for next steps following the present study are presented in chapter 7.

There is insufficient evidence on costs and benefits to make many recommendations on optimal ITP cost-benefit ratios or evaluation evidence on technical solutions to make specific best practice recommendations on effective technology solutions.

3.4.1. EUROPEAN HARMONISED DATA COLLECTION ON FREIGHT CRIME, TRUCK PARKING DEMAND, CAPACITY AND DEFICITS

Recommendation 1: Harmonised data collection on truck parking demand, capacity and deficits

Only very patchy information is available on the problems of truck parking capacity deficit and demand (normal and secure parking) across Europe. We suggest the following actions by the EU:

- § Develop a standard methodology for the monitoring, measurement and forecast of truck parking demand, capacity and deficit problems on the TEN-T including secure parking. The German strategy to enhance truck parking could make a good starting point. The final methodology could be referred to in the EasyWay guidelines.
- § Encourage (or in the longer term mandate) member states to collect this data on a regular basis.
- § Regularly analyse this data at the European level to understand the possible cross-border impacts.
- § Develop and maintain a European truck parking model.

Recommendation 2: Harmonised data collection on freight crime

Only very patchy information is available on the problems of freight crime. We suggest the following actions by the EU:

- § Develop a standard European methodology for the monitoring, measurement and forecast of freight crime including :
 - A harmonisation of the data collection in each state to have the same information throughout Europe and be able to compare the situation. This requires harmonisation and centralisation of reporting.
 - The identification and classification of crime hotspots.
 - The collection of freight crime figures according to locations: on legal or illegal parking; on road, rest areas or services areas; on non-secure parking, minimum secure or high secure parking (by a standard classification).
 - The collection of freight crime data according to other criteria: the frequency, the type of crime, un-safe feelings, the causes, the locations, the circumstances.
- § Encourage (or mandate) member states to collect this data on a regular basis using such a standard approach. Regularly analyse this data and map it at the European level to understand the possible cross-border impacts and needs for building a European network.

3.4.2. EUROPEAN TRUCK PARKING INFORMATION, RESERVATION AND CAPACITY ENHANCEMENT: HARMONISED INFORMATION PROVISION, OPTIMISATION MEASURES AND ADVICE FOR EU ON STUDIES

In this section we make a number of recommendations for a European harmonised provision of truck parking information.

Recommendation 3: Basic characteristics of harmonised and optimised European truck parking information, reservation services

Although it was impossible to be fully prescriptive in part B of the study, we initially recommended the following basic principles of the organisation and design of a European truck parking information service (this is broadly in line with the so far incomplete vision of the EasyWay project)

-
- § The EU should support a model where multiple truck parking information and “central” reservation services (potentially with real-time information on occupancy) can be initiated and operated without restriction by the private sector, non-profit organisations or public sector organisations. Data collection on truck parking sites and provision of these data to information service operators should however be coordinated at the European level (in a maximally distributed/decentralised way). This has been reviewed and analysed in more detail in part B of this study (See chapters 4 and 5).
- § The implementation of dynamic information collection and capacity enhancement services should be systematically planned. The German Federal Ministry has taken a systematic approach to mapping HGV parking deficits and future facilities requirements and has planned an integrated approach to building new HGV spaces, smart ITP capacity enhancement, and dynamic ITP information services, which could be adopted across Europe.
- § The mechanism of data collection and maintenance should be decentralised at least to the level of member states and/or road operators, with possible integration into TMC/TIC systems which could store and process both static and dynamic data. There is no obvious need to centralise truck parking data storage and maintenance at a European level.
- § Pictographic depictions of TPA attributes and the indication of truck parking site occupancy should be standardly defined under the leadership of the EasyWay VMS harmonisation group together with the EasyWay freight and logistics group. This process should include consultation of existing truck parking information service operators, road operators and member states.
- § A standard European truck parking data model should be defined (possibly built directly for the DATEXII environment as long as this will not fatally slow down the process) including truck parking attributes should be defined with the consensus of relevant stakeholders including existing information service operators and road operators / member states and a comprehensive consideration of truck parking information needs including truck parking categorisation, secure parking attributes, information about booking and dynamic occupancy data. This data model should cover the needs of all possible media types, and historical data for the needs of occupancy forecasting.
- § It will need sufficient stakeholder consensus which could be supported by EasyWay and a separate technical study. This structure should use the outputs of the LABEL project if considered appropriate including the LABEL truck lock (security) and star (quality) classifications if at all possible.

- § A data interface/interfaces and communication protocols that enable easy European level static and dynamic data provision should be devised based on the principle of easy access for information providers to all member state / road operator truck parking databases. All road operators and information providers should have easy and free access to all of this data (or at a minimum charge). There are a number of (not necessarily mutually exclusive) options available which need to be further analysed in a separate study including:
- A register of available TPA data sources including how to access them
 - The utilisation of DATEXII connections for dynamic and/or static data sharing/updating between TMC/TICs of different countries / operators and with other information providers.
 - Amended communication protocols for communication to end users using different media (web, TPEG DAB, RDS-TMC, GSM etc.). This should enable easy update of static data on truck parking and broadcast of dynamic occupancy data and should be based on the extension of existing systems if at all possible. (TPEG has an existing format for parking availability while RDS-TMC has a very limited format).
 - A web-based common European data-access interface or a standard data request interface definition (similar to the distributed data access principles of the Transport Direct service for example) to allow standard access to all national and other data sets both static and dynamic even if they have different data structures.
 - Mirrored sharing of copies of all “local” truck parking static data sets between TMC/TICs.
- § Standard levels of truck parking information service should be further defined within the EasyWay project including a full set of data quality requirements and a definition of what is a TPA about which information should be provided.
- § In the short-term, member states and road operators should be encouraged to create their own truck parking databases and as appropriate and most effective collect their own data or contractually oblige / incentivise the provision of this data by parking operators on their networks which currently lack the motivation to do so. EasyWay should take on a role and develop document practical models.
- § A possibility to mandate data provision (to parking operators) and/or collation (to member states or road operators) through a European directive should be examined and considered, at least for a basic level of information (although the feasibility of

achieving this without stronger socio-economic justification seems low, it could be a very effective solution to the problem of truck parking data quality).

Recommendation 4: Definition of EasyWay truck parking information levels of service

These levels of service should assume quite some importance in standardising the actual data collected by truck parking data coordinators and provided by service providers. Therefore we make the following suggestions for optimisation of this process (some of these may be planned already within EasyWay).

- § The EasyWay levels of static truck parking information service 1 should reflect and eventually be a subset of the standard data structure required in recommendation 3.
- § A level “1a” service definition should include the minimum data requirements on truck parking areas for transport infrastructure managers, which should be revised within the EasyWay forum. If this can be achieved within existing standard data structures for example in DATEX II, this should be preferred in order to support accelerated take up.
- § A level “1b” service definition should further define the minimum requirements on detailed information provision and/or standard TPA classifications, which qualify a truck parking information service as providing an adequate level of static information to inform truck parking planning for all types of trucks and truck parking requirements including for example details of the level of secure parking, reservation options, the whole of range of service facilities. Special attention should be paid to a wide coverage of security types and the level of detail and classification of secure parking, and alignment should be sought with the LABEL security and quality categorisations if they are accepted as industry standard.
- § The levels of service should be re-evaluated to be more modular (as is planned) to reflect the needs of different market segments. There are different markets with different requirements and the grading of LOS quality depends on the market segment (long-distance trips with a sleep-over planning requirement or special parking needs are different to short-trips with one or two mandatory stops).

EasyWay should be requested to help define a standard frequency of update for the data in the information standards of service and an acceptable level of error and the scope of requirement to cover TPAs.

Recommendation 5: Other requirements from EasyWay on information provision, booking and capacity enhancement

Some of the following recommendations for EasyWay may well be planned in any case; some of the information may be available after future testing and evaluations. Much of the information should be incorporated in some way into the ITP guidelines as they are revised.

- § Provide more detailed information on the German truck park planning approach to providing ITP measures aimed at capacity increase and include this in the guidelines
- § Provide detailed English technical and economic evaluation documentation of any national truck parking information databases and dynamic information services that are co-funded by the TEN-T fund.
- § The understanding of dynamic truck parking occupancy information technologies reliability and applicability is far from complete. As more experience is gained over the next two years, EasyWay should be requested to provide clear information on testing and investment/operating cost of different technical solutions (in particular the distinction between slot monitoring and in-out counting) for detection and data transfer, integration into TMC/TIC and VMS presentation of such data. As the technology matures, EasyWay should include use-case recommendations and cost analysis on these technologies within their guidelines.
- § Provide a full English translation of the French A13 dynamic occupancy dissemination user acceptance study to enable a better understanding of the actual effectiveness of VMS truck parking occupancy signs and the requirements for improving acceptability. Also more detailed English information should be provided on the evaluation of the A8 Aachen trial of VMS dynamic truck parking information including impact and user acceptance assessment. Any other user acceptance and impact assessments should be also provided in detail in English.
- § Describe the detailed “business case” of implementing a capacity enhancement service (TCP) compared to the classic extension of truck parks, and the build of a TCP compared to the new build of classical parking. This analysis will give to the investors a guideline for their investment and thus may provide the deployment of TCP if the business case seems viable.
- § Provide more detailed description of the technical solution to implement capacity enhancement, their costs (at an indicative level) and some advice of implementation and operation (i.e. the regulation of the available spaces, the viability of the technical solutions etc.)

§ Describe the potential to combine the capacity enhancement service to other ITP services. The business case of building or updating a secure park may be more viable combined with a TCP. Some equipment may also be quite the same (e.g. video, barrier), which will decrease the investment and eventually the fees.

Describe the transferability of the capacity enhancement pilot site throughout Europe and its conditions of implementation including the conditions of the patent use. The Montabaur project was taken into operation in September 2005 and some evaluation will be updated on 2010/2011. The social-economic impacts should be evaluated in terms of driving time respect, fatigue, user acceptance, illegal parking, and environmental impact.

Recommendation 6: Knowledge / specifications still required for European truck parking information, reservation and capacity enhancement services

There is still a shortage of knowledge on these applications that needs to be procured at the European level. The following is required:

- § Guidance on how to plan the implementation of dynamic occupancy provision, capacity enhancement and truck parking space new build.
- § An analysis of the problem solving capacity and potential commercial plus social benefits and full costs of investing public funds into a European system of static and dynamic truck parking data and capacity enhancement measures.
- § An analysis of the market, usage and user acceptance of the existing European and national services including SETPOS TruckInform and TRANSpark and actual information requirements and willingness to pay of different freight market sectors for pre-trip and on-trip information, real time and static information.
- § An inventory of static databases and real-time data occupancy detection available in European member states and road operators (if already covered by EasyWay, then this can just be summarised).
- § A proposal of a standard data structure and data-exchange / communication solution for such a service based on the state of the art and extensive stakeholder consultation.
- § A technical proposal for a European truck parking datasets standard interface if required.

§ A proposal of organisational , process, contractual and legislative models for building and operating such services including the role of the private and public service providers, member states, road operators and the EU.

The model(s) would provide the basis for procuring and operating the European coordinating level of such a service including technical coordination and any data interfaces, and give guidance to member states on how organisational to collect optimal quality truck parking data. It should be flexible enough to include different national road and parking operations models and allow progressive development and increasing quality of the service.

§ Research and development into dynamic truck parking technologies in particular technologies for detecting trucks in TPAs to be used for dynamic truck parking and capacity enhancement, the use of solar powered technologies for TPAs without power and comparative research into the costs and practicality of more manual approaches to providing truck parking occupancy data.

The consortium is not in a position to specify how this knowledge should be gained and disseminated but some of the knowledge and inputs are part of part B of this study. However, intense ongoing involvement and consultation of a wide range of stakeholders including existing truck parking information service providers, EasyWay, private road operators and public and private truck parking operators will be required.

3.4.3. OPTIMISATION / HARMONISATION OF SECURE TRUCK PARKING AND ADVICE FOR EU ON STUDIES

Recommendation 7: A European inventory of high security TPAs

No inventory exists on high security truck parking facilities currently in place across Europe, which is essential for coordinated planning of a secure truck parking network. The EU should promote a study to obtain a comprehensive picture of the situation, including the collection of information regarding:

§ The location of the TPAs: on a main road, other areas nearby, new build or updated parking, level of insecurity identified for the area etc.

§ The technical characteristics of the secure TPAs: safety measures implemented, surface, number of places secured, theoretical evaluation of the SETPOS/LABEL level etc.

§ Services related to parking: other parking non secure, restaurant, shower, facilities etc.

This data will make it possible to realise a European map of existing secure parks. Compared to the European map of crime road transport, stakeholders will have thus visibility as to the priority development of secure TPAs. This will contribute to identify also the level of qualities needed to address the objectives and the market segments.

EasyWay could play a role in this inventory process but a precise role would need to be consulted with the project.

Recommendation 8: Analysis of low and high security truck parking measures

For a number of selected case study high security TPAs, following from the inventory of recommendation 7, it would be also useful to understand in detail:

- § The business case: the detailed cost of equipment, the fee models, the RRH, the different sources of financial support, to address the costs, at least at indicative level, that the investors would have to meet to bring their secure TPAs up to the SETPOS/LABEL standards.
- § The visibility of parking: signage on motorway, internet, pre-booking or booking on trip, type of information available (static / dynamic Information) in order to evaluate the impact of such services in the use of the secure TPA.
- § The user acceptance of this area: the level of occupancy of the secure TPAs, accessibility, booking, the level of knowledge of parking, means of payment, global satisfaction to increase the procurement of a stand-alone business case and make a secure parking place successful.
- § Commercial and socio-economic assessment: impact on illegal parking, freight crime, illegal driving time to evaluate the gain for the stakeholders to contribute to the use of secure TPAs, and the impact on insurance industry.

EasyWay could (is already playing) play some role in this analysis process but a precise role would need to be consulted with the project.

Recommendation 9: Upgrade of SETPOS best practice handbook

SETPOS has created a handbook with aims to help TPA operators to develop their sites to the required (high) security standard which industry requires and also to act as a focal point for information for other stakeholders such as transport operators, drivers, shippers and authorities.

This handbook should be “upgraded” to include the following improved information:

- § Indicative level of investments and operations costs for different circumstance so that investors can make a relevant stand-alone business case including a model that contains approximate unit-costs where possible and advice on how to choose various elements based on the security standard. This is a difficult and time-consuming task as costs vary considerable in different countries and based on context. A sophisticated context based model is required.
- § Widened to include the new LABEL standards.
- § To include a whole range of security standards including simpler measures for low security sites such as lighting.
- § Specific advice for investors on how to identify the best locations to build or upgrade secure TPAs in terms of level of demand, cost, level of freight crime to ensure filling the parking lot.
- § Recommend appropriate security measures depending on the level of freight crime, the type of parking area and the evaluation of the security measures in terms of investment costs.
- § Description and advice on the different levels of service associated to the secure parking (restaurant ...) required by drivers in terms of comfort.

This is a difficult and time-consuming task as costs vary considerable in different countries and based on context.

Recommendation 10: Role of EasyWay in secure parking guidance and TPA information provision

The topic of secure truck parking is not just an ITS or a road operators matter, and therefore it is not appropriate for EasyWay to cover it in full as a subject. However we do think it desirable for EasyWay to provide the following:

- § Guidance on the planning of secure TPAs at a European and national level including the matching of security requirements to crime risk and the business case at a site.
- § Guidance on the state-of-the art technical and (in less detail) non-technical security measures for secure TPAs.
- § Support the process of TPA security classification from the view point of road and public parking operators / owners particularly to define minimum security standards for public truck parking.
- § Full integration of secure parking attributes and/or classification categories into the EasyWay information provision levels of service.
- § Guidance on security standards / levels of service based on the industry discussion, following the LABEL standards if accepted by industry but covering a whole range of security requirements.
- § Guidance on integration of high-security TPAs into a European real time information and central booking service.
- § Detailed documented evaluation and documentation of implementations including user acceptance, evaluation of commercial performance and costing.

Recommendation 11: Harmonised and optimised European security standards

Security standards need to be long-lasting and need to cover a whole range of security requirements and levels if they are to gain the support of the member states. We make the following recommendations to the EC

- § The SETPOS secure standards are to a degree based on technologies. As technologies evolve quickly, there is a risk of divergence between classification and the real secure services provided by the parks. It is necessary to carefully assess the outcome of the LABEL project and consider another definition of secure standards, based on functionalities rather than on technologies if LABEL does not provide this.
- § Define the process to update the SETPOS/LABEL standards: the timing of updating the standards, who will manage this evolution, how to update the labelling, how to

guarantee the coherence across Europe between the secure equipment of the sites and the evolution of the standards, the financial issues.

Define security standards for truck parking covering a whole range of security needs including lower security public sites, including for example lighting and visibility of the truck parking area.

4. Information system: information and reservation

4.1. Objective

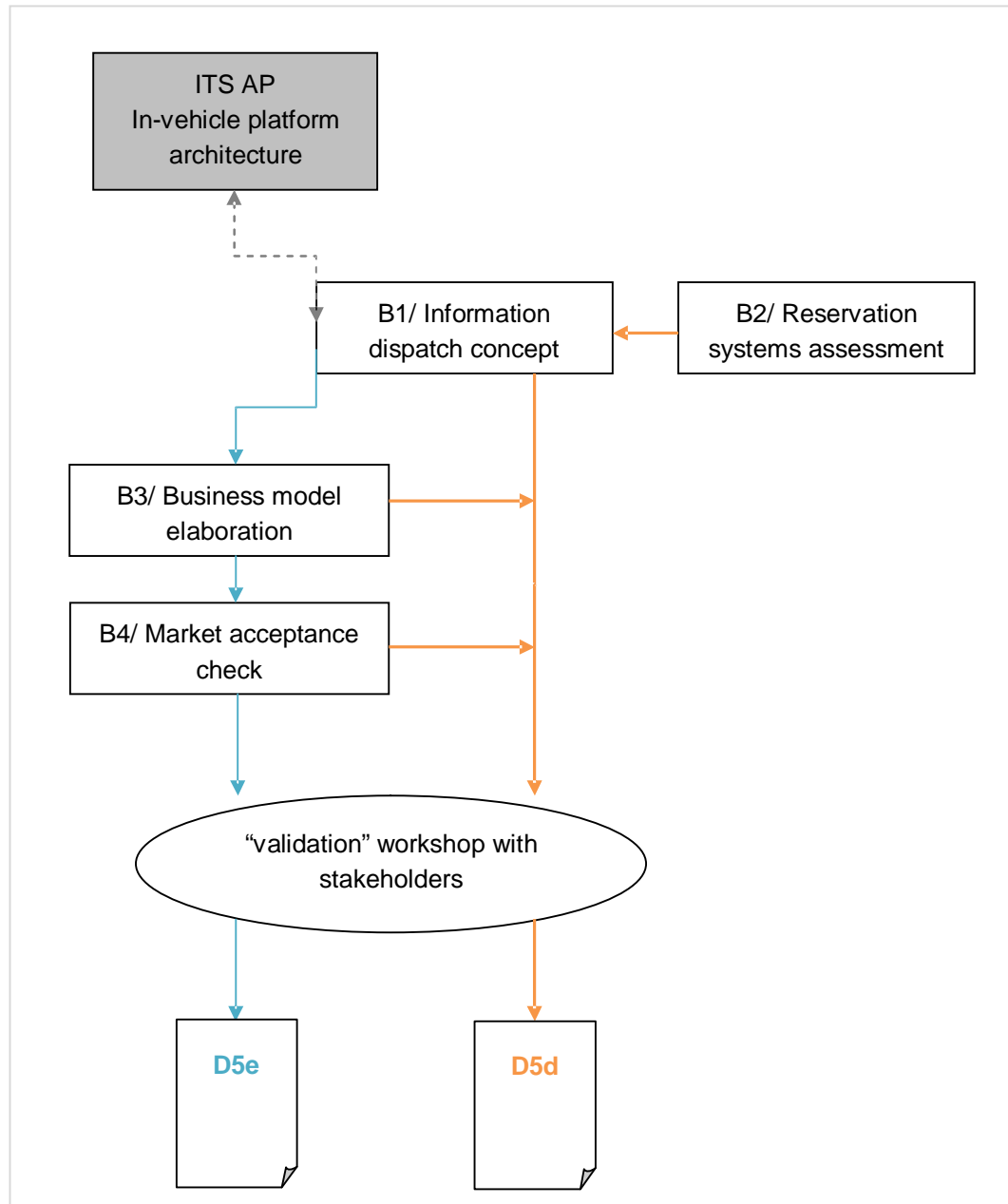
The objectives of this task were to elaborate the most efficient concept to dispatch truck parking availability information, assess the effects of reservation systems, elaborate a “business” model to guarantee seamless cross-border information through harmonised approach and check the market acceptance.

4.2. Methodology

4.2.1. GENERAL METHODOLOGY

The following scheme details the methodology employed to consolidate the reports:

- § D5d - CONCEPT FOR INFORMATION DISPATCH AND ASSESSMENT OF THE EFFECTS OF TRUCK PARKING RESERVATION SYSTEMS
- § D5e – REPORT ON A FEASIBLE BUSINESS MODEL FOR A INFORMATION / RESERVATION SYSTEM FOR TRUCKS AND MARKET ACCEPTANCE SURVEY



4.2.2. STAKEHOLDER DESCRIPTION

The operating of transport services requires concerted action of many stakeholders, ranging from cargo owner and receivers, to truck operators and drivers, and road and enforcement authorities. Successful deployment of truck parking information and reservation systems requires striking a delicate balance between the interests of the stakeholders.

According to EasyWay Guidelines and in case of Intelligent Truck Parking (ITP) reservation system the key players are:

- The authorities responsible for the legal framework governing land use and road usage ('public authority').
- The road authorities defined as public body responsible for the construction, operation and maintenance of a specific road network ('road authority').

The private road operator or concessionaire defined as a company having a concession for construction (eventually), operation and maintenance of a specific road network ('road operator'). The last two players are road operators. Their organisation could also include parking construction and operation as well as information services to the road users. In case of private road operators, their scopes of activities and responsibilities are defined in their concession contract, which, though they are signed for a very long period of time, can be amended under certain conditions.

In this study, we consider the provision of information for available parking lots and reservation services in road sections as parts of these information services to the users, still the responsibility for collecting, handling, managing and provisioning these parking related data can be subject to specific discussion in each Member States.

- The parking area providers which are building, operating and maintaining the parking areas, could be both public and private, with differing scope of activities ('parking owner').
- The parking area operator are parking provider only responsible for the operation – could be both public and private ('parking operator').
- The booking operator is a service provider only responsible for booking facilities – could be both public and private but likely to be private ('booking operator').

The EasyWay overview is not exhaustive, besides the key players, other stakeholders can also be identified:

-
- Insurance companies or cargo owners, that sometimes prescribe secure parking to their hauliers
 - Petrol Card providers, defined as payment means providers, with specialised business models for the road transport sector
 - Truck manufacturers
 - Navigation and fleet management solution providers
 - Associations of hauliers, truck drivers, road authorities, road and parking operators
 - Content and service aggregators
 - Parking equipment suppliers
 - Truck drivers

The following definition of key stakeholders is used in this document:

- **Driver** – person driving long haul trucks
- **Parking operator** – organisation (public or private) managing a parking facility on the TERN
- **Road authority** – organisation (public or private) operating roads
- **Haulier** – company owning or operating trucks for haulage over long distances
- **Cargo owner** – owner of the cargo
- **Insurance company** – company providing insurance for long haul trucks or cargo.

4.2.3. INFORMATION DISPATCH CONCEPT

Sufficiently well managed and secure parking spaces will contribute to traffic safety on the TERN. Because of the deficit of suitable parking areas in the major European transport corridors, adequate solutions have to be defined to optimise parking spaces and to manage their occupancy more efficiently. Making information about availability of parking spaces available to drivers and fleet operators is an essential first step in improving overall TPA use.

The growing need for information provision to end-users as well as on optimal managed truck parking areas has stimulated the market to establish web based information platforms. The various platforms often lack a harmonised European approach.

The objective of this study is to elaborate the most efficient concept for the dispatching of occupancy information via roadside, in-vehicle or back-office channels. The following requirements have been adopted from EasyWay:

- Provide seamless cross-border and consistent information and forecasts on available parking places, regardless of the organisation responsible for the operation of the respective section of the network.
- Support the truck drivers before and during their journey in respecting traffic and driving regulations.
- Have a harmonised and therefore understandable design and functionality of the information provision and the on-site systems.
- Guide the driver in selecting a parking place on-site, make relevant data available in standardised formats to service providers.

The architecture has to allow content aggregation on different geographic levels. This can be achieved by defining a standardised interface for publishing TPA information on a single or multiple TPA. This standard can then be used by individual TPA, and by parking content aggregators to publish information.

To describe information about parking facilities for trucks it is important to have a method that:

- Allows for the language and map-independent coding of parking information.
- Can provide detailed information of the facility; opening hours, capacity, parking fees, available payment methods, etc.
- Can distinguish different truck parking requirements, i.e. size restrictions.
- Can describe driver facilities at the truck stop in detail; toilets, showers, catering, etc.
- Can provide information on current and expected occupancy.

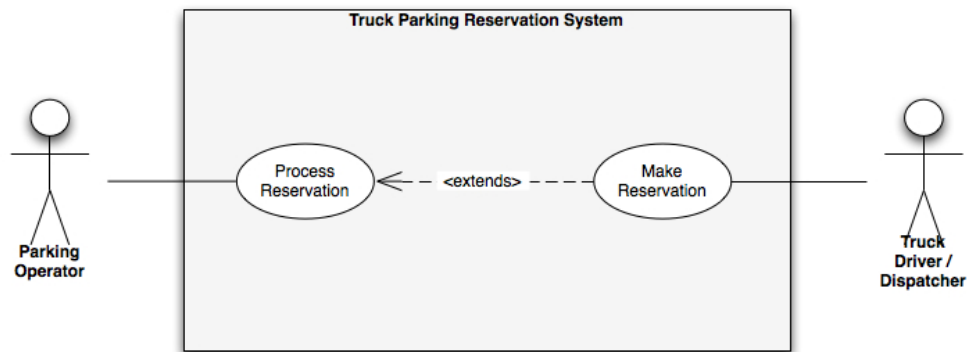
Several traveller information standards exist to date that can describe parking facilities: i.e. RDS/TMC, DATEX and TPEG.

4.2.4. TRUCK PARKING RESERVATION CONCEPT

4.2.4.1. DEFINITIONS

A reservation is an arrangement whereby something, esp. a seat or room, is booked or reserved for a particular person.

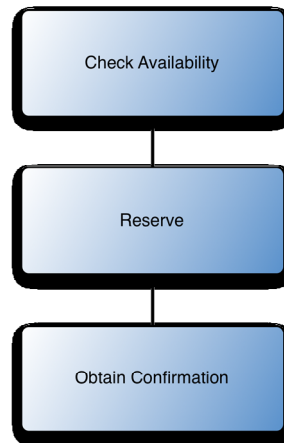
In our context, a reservation system represents nowadays a computer system providing information about one or more parking areas such as locations, existing services, occupancy, fees and total amount of parking place, whereby users can make a reservation.



Use-case diagram for truck parking reservation

The use-case diagram above represents the highest level of the reservation process.

The structure of a simple reservation process consists of three steps: Check availability, Make reservation, Obtain confirmation (see illustration).



Simple booking process

While the reservation process applies to all users in some contexts, it is offered as an option in other contexts.

- Where reservation is mandatory, or at least common rule:
 - Air passenger transport
 - Long-distance train passenger transport
 - Most hotels
 - Theatres
 - ...
- Where reservation is optional, or a rule of exception:
 - Most restaurants
 - Cinemas
 - ...

In the context of secure truck parking, reservation is generally seen as an option for the users.

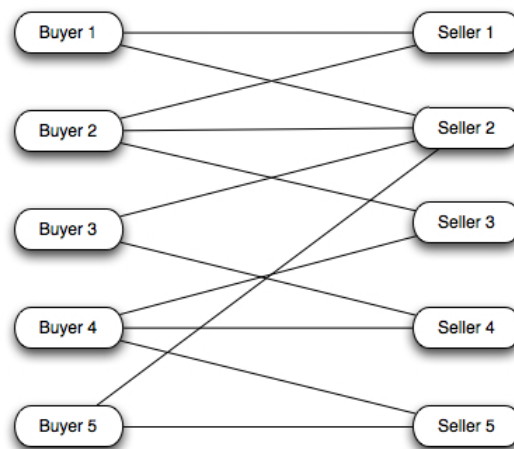
In general literature about computer reservation systems, such systems are described as **inter-organisational information systems (IOIS)**, in that they imply that at least two independent organisations use a common information system.

Two theoretical models are described:

1. **Dyads** between pairs of seller and buyer

Each actor develops links to a limited number of partners. System integration between each pair of partners is optimised.

In the extreme case, two actors develop an exclusive partnership with particular standards of communications. In this case we are dealing with what is commonly called electronic monopoly.



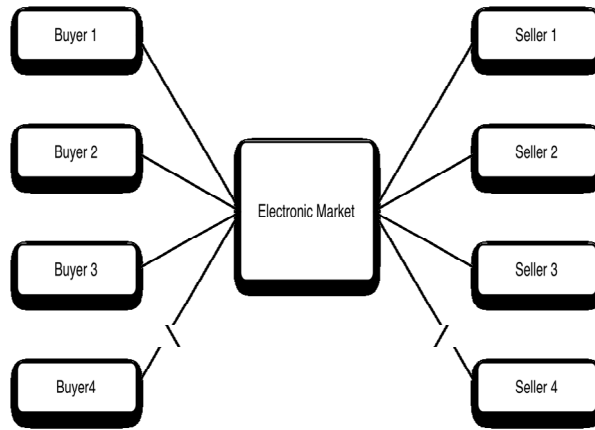
Electronic dyads

Computer reservations are made through direct interactions between buyers and sellers. Each dyad may be a proprietary system.

This model corresponds to the situation where each truck driver (or truck drivers from the same company) would only deal with limited parking area operators. It implies the creation of exclusive partnerships.

2. **Electronic market.**

Each actor has access to an unlimited potential of partners through a standardised relationship. The cost of searching optimal buying or selling conditions for a given product is minimised.

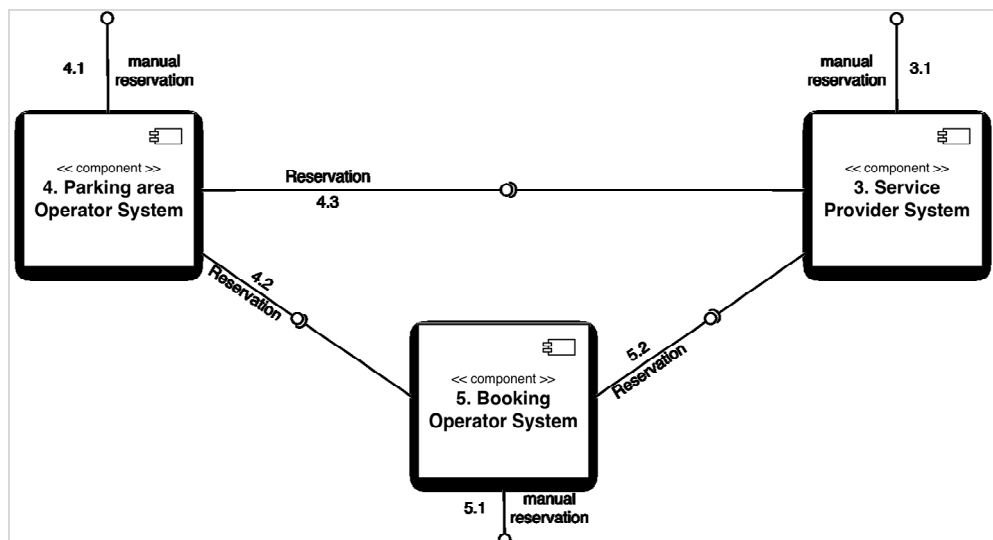


Electronic market.

Computer reservations are made through an information system to which all buyers and sellers have access.

The electronic model corresponds to the possibility a truck driver to access a lot of available spaces amongst parking areas. He can then choose a suitable solution to meet its needs. All processes of exchange are standardised.

The study of existing reservation system brings into relief three different ways, as represented in the subsequent component diagram:



Component Diagram of reservation structure

The table below described more precisely the nature of these components:

Nr	Component	Current status
3.	Service providers (SP) Systems are platforms developed for truck drivers to carry out various applications. SP are responsible for personalising the content for their customers, and optimising the information for their channel(s).	Service providers include public and private parties. The current system of Truckinform.eu is a SP system.
4.	The truck parking area Operator (TPAO) System allows the operator to manage his capacity, to process reservation requests from booking operator and to manage user's direct reservations.	A few of truck parking area operator have already developed such system. IT companies could easily develop standard solutions.
5.	The Booking Operator (BO) System provides a single channel for making reservations on a large number of parking areas to service providers and users, and for receiving reservations from a large number of service providers and users to parking area operators.	Some proprietary reservation systems are available but none has been used as a central pan-European reservation system for truck drivers.

Description of the tree components

Moreover it should be noticed that the SP system could be more or less developed, providing static information or real-time information about reservable parking spaces, while the BO system provides an inventory of directly reservable parking spaces. Thereby the major difference between those two systems from the fact that the BO has the capability to confirm a reservation by itself, whereas the SP should ask first to the TPAO or the BO.

Furthermore the roles of these components are not mutually exclusive, and can easily add up to meet the needs of the truck driver. Instead of being an inventory, the SP system could thereby become an intermediary that uses the inventory of the BO system (Interface 5.2).

4.2.4.2. INTERFACE DESCRIPTION

Based on previous conclusion, we will now describe the different interface than can be develop to meet the need of efficient solutions.

Nr	Interface
3.1	Interfaces that allow truck drivers or dispatchers to make reservations from possibilities selected by service provider through channels offered by service provider.
4.1	Interface that allows truck drivers or dispatchers to make reservation for a specific parking area through channels offered by the parking area.
4.2	Interface that transmits tariffs and capacities from the parking area operator to the booking operator and reservation details from the booking operator to the parking area

	operator.
4.3	Interface that allows the service provider system to forward reservation requests, and responds with a conformation or rejection from the parking area operator.
5.1	Interfaces that allow truck drivers or dispatchers to make reservation from possibilities covered by booking operator through channels offered by booking operator.
5.2	Interface that allows the service provider system to forward reservation requests, and responds with a conformation or rejection from the booking operator.

Descriptions of the functions of each interface

A lot of these interfaces do not currently exist but they could easily be developed once the reservation system model will be decided.

Up to now the standard DATEX II data model only provides a basic set of information for car parks (such as Occupancy, Capacity, Exit/Fill rate, Queuing time). It has not been tailored for truck parks, let alone for reservation requests, although a pilot DATEX II truck parking extension is currently being tested. Such possibilities can be input as new blocks to the data model.

Same comments for the data format TPEG that does not include upstream information flow.

Besides open and standardised services interfaces could be benefit to the efficiency of the seamless cross-border dispatch.

What we can learn from other business (airlines, ferries...) is that reservation systems are all based on proprietary information exchange methods, none of which has been standardised in IEEE, ISO, or CENELEC.

4.2.4.3. ASSESSMENT OF RESERVATION POSSIBILITIES

We will now try to bring out the respective advantages and disadvantages of every reservation possibility for each stakeholder:

Players	Options	Benefits for players	Drawbacks for players
User	<i>Reserves at TPAO</i>	<ul style="list-style-type: none"> - Personalised relation - Immediate Confirmation 	<ul style="list-style-type: none"> - Specific Location - Limited channels - Security of the transaction
	<i>Reserves at BO</i>	<ul style="list-style-type: none"> - Large choices of locations - Immediate confirmation - Several efficient channels - Security of the transaction 	<ul style="list-style-type: none"> - New intermediary - Confusing if numerous
	<i>Reserves at SP</i>	<ul style="list-style-type: none"> - Most appropriate channels - Service bundle 	<ul style="list-style-type: none"> - Limited choices of locations - No immediate confirmation

		- Security of the transaction	- Relevant if numerous
TPAO	<i>Reservation from User</i>	- No commission - Direct relation	- Handling cost
	<i>Reservation from BO</i>	- More reservation demands - RS can be provided by BO	- Commission - RS can be to buy
	<i>Reservation from SP</i>	- More reservation demands	- Commission - RS can be to buy
SP	<i>Reserves at TPAO</i>	- No commission	- Need to ask for availability
	<i>Reserves at BO</i>	- Immediate confirmation - Need to create interface with BO	- Commission
BO	<i>Reservation from User</i>	-	- Efficient channel to be developed
	<i>Reservation from SP</i>	- No needs to develop several channels	-

Benefits and Drawbacks of different situations

As we can see above, all of these stakeholders have real interests in the reservation process. However their usefulness has not been clearly worked out.

Regardless to these options, several channels of reservation are and would be available: Website, Call centre, Mail, On-board platform. Electronic booking through website is a convenient secure and usable channel, well suited for truck drivers or hauliers planning journeys. On-board platform used with PDA or on-board equipment offers great flexibility for on-trip reservation; however it also needs costly equipment. Phone booking is the simplest and most usual channel for processing a reservation on-trip or pre-trip, but potentially less secure and more prone to error. Besides it seems impossible for a parking area operator to provide reservation possibilities through all these channels, without making use of service providers. This conclusion can also be extended to booking operators, which could prefer to let service providers develop various channel to access their reservation system.

Therefore SPs seem to have an obvious role to play in providing easy and aggregated access to services, and there is no doubt about their development by public or private parties.

In the same way, the participation of TPAO is indispensable to the reservation process on the level of the single facility.

However the real question concerns the utility of one or more booking operator systems, the role they have to play, how they relate to TPAO and SP, and the characteristics they require to become an electronic market useful for every stakeholder. As previously

indicated any operational and successful central reservation service would need to accommodate a whole set of parking sites functional set ups and needs to allow convenient payment.

The effects of reservation systems for TPAs are not well known and documented on a general level. Parking operators often argue that reservation systems will have negative effects to efficiently use parking areas.

In this table, the relative importance and its appraisal by different types of stakeholders are not presented. The numbering does not imply any hierarchy of the effects.

#	Effect
1	<p>The possibility of reservation allows drivers to avoid situations where they would:</p> <ul style="list-style-type: none"> • Be non-compliant with driving and resting time regulations. • Park on accident-prone locations • Park without protection from criminal attacks on their trucks • Park on locations without toilets and other services • Park on locations where the truck damages the road, or causes visual disturbance. <p>The two first items induce a general decrease in accident risk. The third item induces a general economic gain. The two last items reduce negative impacts on the neighbourhood. All five items contribute to improve the working conditions of the drivers.</p>
2	Reservation induces mental stress for the driver which is forced to reach his reserved parking space on time.
3	Reservation encourages the respect of driving and resting times regulations, since it allows journeys planning. However, in situations of congestion where drivers could be jammed for a while, reservation may encourage the contrary in that drivers will want to reach their reserved and paid parking space.
4	Drivers who have a reservation avoid time loss for searching parking space.
5	Reservation obliges the user to transmit personal data to the reservation system operator.
6	Reservation involves workload for the users. The reservation process, if done by the driver, may interfere with safety-relevant driving tasks.
7	The possibility of reservation allows a better planning of journeys, since it allows dispatchers to plan routes more efficiently and easily.

#	Effect
8	Reservations provide a forecast of occupancy to parking operators. On this basis, they can optimise their management of parking space, staff and services, and realise a productivity gain. Potentially, this reduces the need for new parking spaces.
9	The possibility of reservation attracts supplementary customers because they are sure to find a parking space.
10	The management of reservations obliges the parking area operator to maintain empty capacity until the reserved vehicle arrives. In situations with high demand, this requires a strong access control and may induce an overall decrease of parking volume.
11	The possibility of reservation involves a risk of no-show that has to be financially secured.
12	The management of reservations requires resources: IT system, and qualified human resources. It raises the complexity of the parking area operator's business.
13	The existence of parking reservations decreases the number of vehicles that move slowly or dangerously because they are in search of parking space, or that queue up at the entrance of a full parking area. This induces a general gain of traffic safety, and reduces an element of congestion.
14	The existence of parking reservations decreases the distance driven in search of parking space. This induces a general gain for environment.
15	The generalisation of reservation induces a better distribution of demand in situations where demand is high.

Overview of reservation effects

4.2.5. BUSINESS MODEL ELABORATION

The research adheres to the Principles for Specifications and Deployment of ITS. This means the proposed business model shall be based on the needs of all relevant stakeholders. A strong focus should be given to the form of the proposed organisation.

The study has been carried through the following stepwise approach:

- § Definition of the product: objectives, target audience, functional, technical and operational requirements, success factors (rated 'important' / 'critical' / 'important') and key roles and tasks
- § Description of stakeholders: importance, business goals and requirements
- § Overview of costs, benefits and drawbacks
- § Definition of possible organisational setup scenarios: state-of-play, description of organisational setup scenarios including division of roles and tasks, and required system concept
- § Assessment of scenarios: fulfilment of product requirements, stakeholder requirements, benefits and drawbacks, identification of required actions
- § Market Acceptance analysis
- § Drafting of conclusion and recommendations

The research is based on desk research and has focussed on establishing an organisational setup that balances the interests of all stakeholders, while creating an ideal environment for the development of TPA information and reservation services (TPA-IRS).

The amount of research data available on the relevant business parameters is limited. For the development of a full-fledged business model with forecasts of costs and revenues, additional field data are required.

The business model adheres to the principles of subsidiary and proportionality as defined in the Treaty on European Union:

- § The proposed product targets stakeholders involved in the long-haul cross-border transport of goods, but can be used for intra-national haulage as well.

-
- § Geographic coverage is assumed to be limited to truck parking areas near or on the Trans-European Road Network, but will allow for adoption by non-member states, and extension to lower level road classes.
 - § The research includes as much as possible the interests of all stakeholders involved.
 - § Recommendations should not hamper existing commercial and public initiatives to provide TPA information and reservation services, but incorporate and stimulate if possible.
 - § Recommendations take into account the EC's limited resources and wielding power, and are therefore limited to consensus building, stimulation of research and development, and regulatory and legislative action.

4.3. Results

4.3.1. CONCEPT FOR INFORMATION DISPATCH

To establish a pan-European truck parking **information service**, it is essential to stimulate disclosing of information by parking operators. The organisational and business model that is chosen will determine to a large extent the chances of success.

An important enabler for a successful business model will be the definition of a common standard for the automated publishing of coded information by parking operators. Once approved as standard, TPEG-PKI or DATEX II (after stabilisation of the pilot truck parking extension) would be good candidates for the standard. A central registry of where information of parking facilities is available needs to be maintained at a central location.

The adoption of an open standard to stimulate dissemination of occupancy data will allow the local use for roadside VMS, as well as allow for the aggregation of information from multiple sites.

This system setup allows for different content aggregation:

- On different geographic levels: per site, per parking operator, per road section, per region, per country, for multiple countries, etc.
- By public or private organisations.

For the distribution of local information, VMS provides an effective means of communication. The standardised interface will lead to lowering of VMS deployment costs.

By combining occupancy information from multiple sites, a complete feed of occupancy can be provided to in-vehicle systems. Multiple organisations can carry out this task for their own or their customers benefit.

Mobile Internet provides an effective channel for the distribution of truck parking information. International GSM roaming tariffs could discourage usage abroad but the EC has successfully worked on reducing these costs. Mobile Internet services could in future be provided through satellite based data casting, further reducing distribution costs.

By combining occupancy information from multiple sites, a complete feed of occupancy can be provided to back-office systems. Multiple organisations can carry out this task for their own or their customers benefit.

From the present report, it appears that **reservation of truck parking** is feasible, exists in reality, and meets a certain demand from the users. However, it appears as a marginal phenomenon at present. From the precedent studies we have underlined the different hesitations concerning truck parking reservation.

We don't know the general demand for reservation. The SETPOS market research stated in 2005 that truck driver usually considered reservation as being not needed, impractical or a luxury. However the number of truck driver polled, their location, and their habits were not detailed. The results and analyses document in the present report give no sufficient evidence for saying that there is a positive business case for offering reservation. There are contradictory stakeholder interests: Parking area operators may prefer not to offer the reservation and to see a queue in front of their facility rather than having to manage reservations. Truck drivers don't like to queue up, but they still may prefer queuing to a booking process and a booking fee.

The effects of reservations are insufficiently known for demonstrating its usefulness to the single stakeholders.

From another point of view, there is a well-founded political demand for Intelligent Truck Parking (ITP): it adds sense to the TERN, it is beneficial to society, and it raises the value of the truck parking business, thereby generating investments in new parking facilities that will be required in the future in order to cope with the expected raise of traffic volumes.

Also, reservation is perceived as an essential part of ITP, and to that extent reservation is a desirable service.

Actually, truck parking reservation can be seen as a "marketing dream" for the time being. From a technically feasible product meeting special demands in some sectors, a mass product must be created as well as the general demand for it.

From this point of view, it is recommended to associate reservation with the labelling of security levels, since labelling also is beneficial to generate notoriety of a product and standardised expectations towards it.

Further, when investigating business models, it must be kept in mind that the decisive arguments for truck parking reservation in the present context seem to be political rather than single stakeholder interests. It is therefore recommended to include eventual regulatory actions and eventual public financial interventions in the discussion of business models, and **to target the business models towards the emergence of reservation as a standardised mass product.**

4.3.2. BUSINESS MODEL FOR AN INFORMATION / RESERVATION SYSTEM

4.3.2.1. COSTS AND BENEFITS

This section provides an overview of costs for the implementation and operation/maintenance of a TPA-IRS based on previous research. In most of the related previous studies information on costs is limited or relevant to this study.

The costs for collecting occupancy data are often marked as the key inhibitor for the establishment of TPA-IRS. This is however questionable. As indicated by the table the costs for installing and operating basic occupancy counting systems are quite low, in particular in comparison with the costs of constructing and maintaining TPA.

For data collection costs it is assumed that inductive loops are used. In European studies there is no general data on average costs since only individual facilities with stand-alone constructions have been established. In field observations on truck parking facilities, as well as device costs, installation feasibility in-pavement inductive loop detector as the primary type of vehicle detection technology for parking data are recommended because of its abilities of vehicle classification and operations under all weather conditions and over night, its feasibility of installation in most cases of truck parking facilities, as well as its reasonable performance-cost ratio. Different studies assume implementation costs for loop detectors between €2'300 and €6'200 per site and operation/maintenance costs of about €390 to €620 per site and year.

For **information display and dissemination** as another important component of a parking information system VMS are foreseen, which are responsible for disseminating the parking related information to truck drivers during the trips. Basically there exist two technologies, LED or prism technology.

Different sources come from investment cost of VMS between €40'000 and €93'000 and operation/maintenance cost between €1'800 and €4'700 per VMS depending on dimension and the used technology.

In the SETPOS Final Report it is mentioned that the costs per facility add up to about €60'000 – €70'000 Euro and €10'000 to 15'000 per truck parking place. These cost evaluations are based on the two German test sites Aachen and Brohltal. This price includes sensors (minimum of four necessary), sensor installation, evaluation unit, data transmission, power supply (incl. underground work), and a data centre.

The benefits from reservation service charges, if ever raised, are for the reservation service provider and the parking fee will be raised by the TPA operator. But in both cases the costs for operation the information, reservation and parking service will not be covered only by these fees. Again the most critical situation concerns the TPA operator. While there can be clear benefits to the operator, there is also the perception that TPA-IRS can actually reduce occupancy.

The **TPAO reservation system** allows the operator to manage his capacity, to process reservation requests from the booking operator and to manage user's direct reservations. For this system cost estimation is difficult and our assumptions base on similar systems because there is no reliable information in previous research. A study estimates costs for a database and software for a billing and pricing system between €8'000 - €12'000. The database system contains parking pricing structure and availability so that is similar to a reservation system. Annual cost for operation and maintenance are not specified. The personnel costs as well as cost for office rooms are not considered. It is assumed that it does not need a full time position at the TPA side and the workstation can be integrated into existing office rooms.

TPA reservation systems also require access control systems, and proper fencing. These costs are not considered in this section. Access control systems however are able to provide occupancy information.

A **central reservation service** bundles all reservation requests. The central reservation service centre transmits every single reservation request to the regarding TPA. It consists of a data centre, a call centre and needs permanent allocation of staff. The cost estimate is based on information from Highway Park.

Research into potential revenues for TPA information and reservation services is limited to several enquiries with a limited scope. All results however point to a latent desire for such services. Research in the US concludes that 70% percent of truckers would use up-to-the-minute information about parking areas. Research in Schleswig Holstein (Germany) suggests that 91% of truck drivers would welcome a reservation system.

The willingness to pay for occupancy information is very low. Nett revenues for in-vehicle TPA information services should be assumed close to zero. Especially if the information is – as recommended – also provided for free on VMS.

The willingness to pay for reservation systems is also limited. The research in Schleswig Holstein (Germany) showed that 74% of truck drivers are willing to pay a fee for a reservation, if compensated with free facility services. Highway Park in Germany is operating a reservation service charging €3 per reservation The secret of the service is the lowering of the usage threshold by charging the costs to tank cards. Systemparken charges €12,50 for reservation and parking fee.

The situation is somewhat similar to the online services offering provided by manufacturers of personal navigation devices. The willingness to pay for any online content is limited, even if the perceived benefits of using the service are considered high. Many motorists for example deem real-time traffic information useful but the willingness to pay is limited. Navigation providers manage to generate revenues from online services by combining the services into service bundles, or by using the service simply to generate revenues with the main product. For truck reservation, similar solutions could be envisaged. HighwayPark demonstrates by providing the reservation service as an extra to the fuel card.

Additional to the microeconomic consideration of costs and benefits there is the macroeconomic approach. Herein the socio-economic aspects of the implementation of an TPA-IRS play a role. Just these aspects generate costs or benefits in the macroeconomic sense.

The basis is the problem of external costs of transport. External costs are costs to society and the internalisation of external transport costs is discussed in a lot of studies across Europe. The European Commission has commissioned the IMPACT study in order to summarise the existing scientific and practitioner's knowledge.

External costs reflecting all costs occurring due to the provision and the use of transport infrastructure, such as wear and tear costs of infrastructure, congestion costs, environmental costs, accident costs. A lot of costs can be set in monetary terms by using scientifically measured cost rates. But there are also additional benefits which cannot be presented in monetary terms because there are no cost rates available e.g. benefits of better working and resting conditions for the drivers. In that case a further investigation in scientific approaches is needed.

But beside this effects and their measurement there exist also a lack of basic knowledge. Road authorities agree that off-site parking has a negative effect on road safety and driver and cargo security. Although most road authorities agree that TPA-IRS is a good idea, they are not always convinced this will merit the required investments. One reason is the limited availability of research into the effectiveness of such services in combating off-site parking. To determine the socio-economic benefits of TPA-IRS, more information is required on:

- § The socio-economic effects of off-site parking; what are the chances of theft, accidents inside versus outside the TPA?
- § What is the socio-economic damage of theft and accidents resulting from off-site parking?

- § How big would the reduction in off-site parking need to be to merit the investment in TPA-IRS?
- § How effective is TPA-IRS in reducing off-site parking?

4.3.2.2. SCENARIOS

Existing systems have proven that technology is not the issue. Business restrictions have hindered systems from developing rapidly. The scenarios therefore have been based on different organisational setups, ranging from a mainly public scenario, to a mainly private scenario. The suitability of the scenarios is assessed in the next chapter against the product and stakeholder requirements and business goals.

In the **public scenario** all roles that can be carried out by public authorities are carried out by public authorities.

It is assumed that in the public scenario, funds for the implementation and operation of the TPA IRS are provided by public authorities. Public authorities also play the leading role in the operation of the system.

In the **public private partnership**, public and private organisations develop a partnership where roles and responsibilities are divided between public authorities and one or more private companies, with or without setting up a joint organisation. In general a PPP will be based on a covenant signed by key stakeholders.

In this case it is assumed that public road authorities and TPA operators collect and publish occupancy information for all TPA on the TERN, and provide a standardised reservation interface for secure TPA. In the PPP, public authorities also play an important role in encouraging privately operated TPA to publish occupancy data and provide reservation services. The aggregation of occupancy information and delivery to the end-users in the PPP is a task for private service providers. Private companies in the PPP also develop and promote TPA reservation portals.

In the **trusted third party model (T3P)**, an organisation is endorsed by public and private organisations to carry out operational tasks. This organisation can be a not-for-profit organisation or a private company.

In the T3P model, existing non-profit content TPA aggregators are the trusted parties that would collect and publish occupancy data from the TPA, and provide a TPA reservation portal. The trusted parties are obliged to provide private companies access to the information and reservation services. As in the PPP, public road authorities and TPA

operators collect and publish occupancy information for all TPA on the TERN, and provide a standardised reservation interface for secure TPA. Also, public authorities play an important role in encouraging privately operated TPA to publish occupancy data and provide reservation services.

In the **private model**, the implementation and operation is left to the market. This means private parties cover costs for the implementation and operation of the TPA-IRS.

In this case this would mean that private companies collect occupancy data themselves on-site. Public and private TPA would only host the required equipment.

The following assumptions were made:

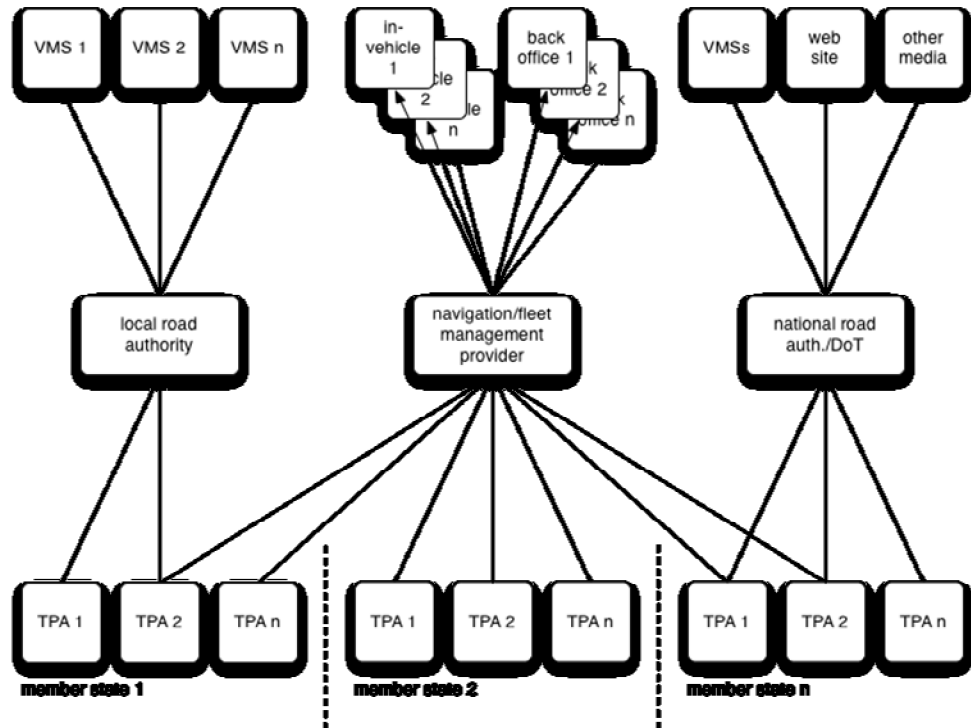
- § In the public and PPP model, information is aggregated on member state level, and reservations are processed on a national level. Taking this to a higher level would require the establishment of a European office for TPA aggregation and reservation handling, which would need to be justified with regards to the principle of subsidiarity.
- § Provision of information and reservation services in-vehicle is assumed to be a fully private task since companies already have the required infrastructure in place.
- § For the public-private partnership and trusted 3rd party model, it is assumed that the TPA operators are responsible for the collection of occupancy data. PPP and T3P models require a clear division of responsibilities to succeed. The costs for implementation and operation of the required counting equipment could however partly be provided through subsidies.

It is important to note that regardless of the model chosen, participation of public and private parties is required to successfully deploy a TPA-IRS. Section [Scenario Assessment] assesses the stakeholders' contribution and benefits in the 4 organisational models.

4.3.2.3. SYSTEM ARCHITECTURES

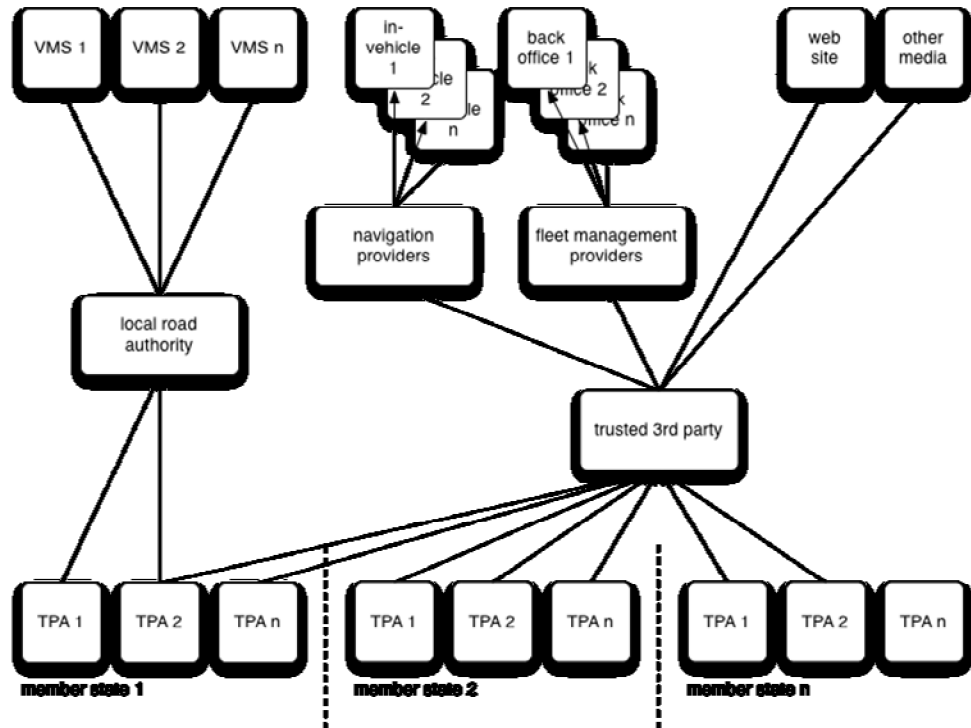
Depending on the organisational model, the system architecture needs to be amended to fit the specific requirements of the organisation.

The diagram below represents the overall architecture for the TPA information service for the public and PPP-model.



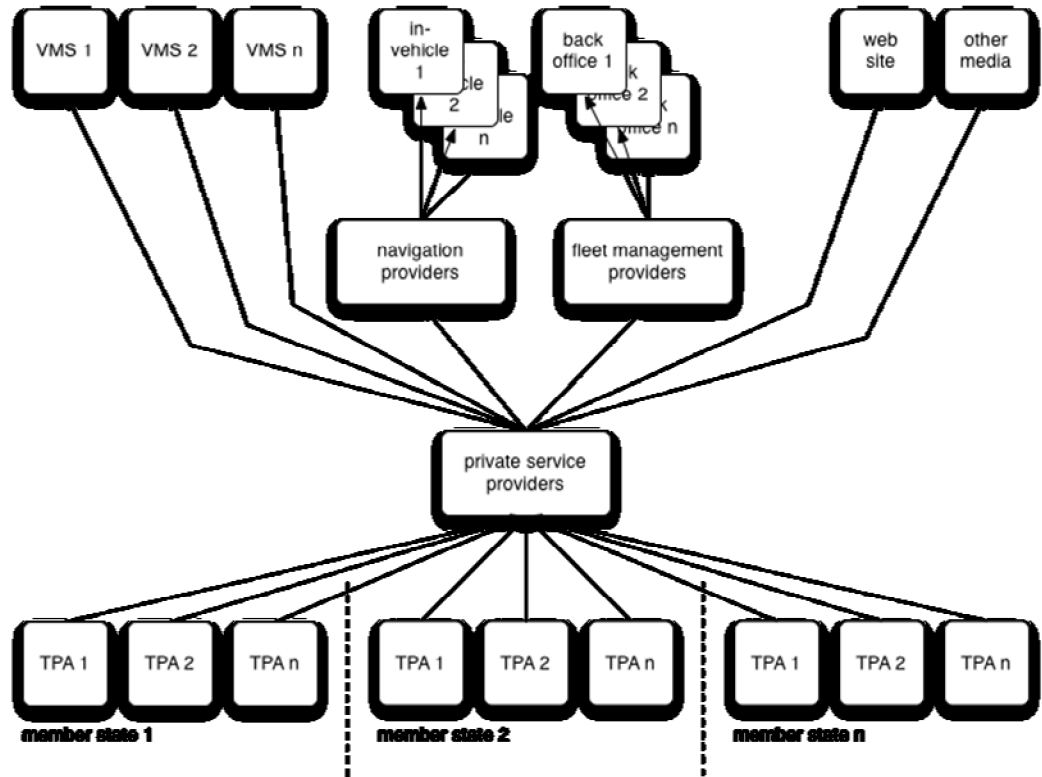
As can be clearly seen, in this architecture the data collection and distribution is done in parallel. This approach would allow the development of services by public and private parties at different speeds.

In the T3P model, one (or several) trusted third parties aggregate information. This provides a one-stop-shop for private navigation and fleet management solution providers.



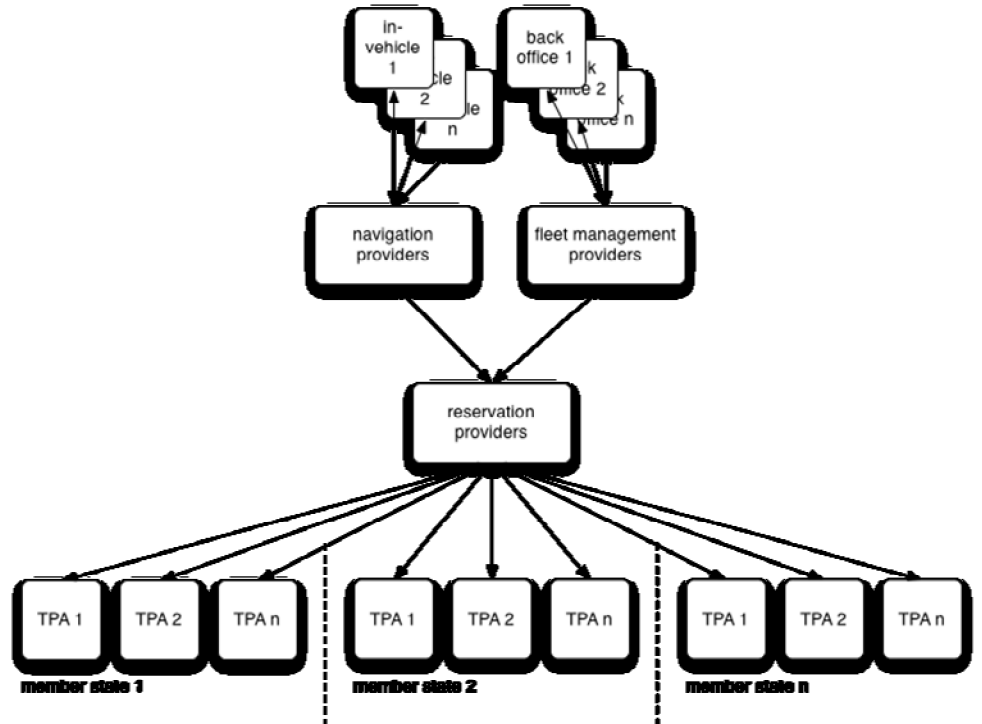
In the T3P model, it is assumed that national authorities do not play a role in the system.

In the private model, private parties are in charge of collecting, aggregating and distributing TPA information.



The reservation service can be implemented and operated separately from the information service. To the end-user both systems however can be presented as a single service.

In order to be successful the reservation service requires centralised processing of reservation requests. The global system architecture will therefore be similar regardless of the organisational model. Depending on the selected organisational model, the 'reservation service provider'.



4.3.2.4. SCENARIO EVALUATION

The evaluation of the scenarios is a qualitative approach based on the plausible description. By using a rating scale, the scenarios are evaluated for **fulfilment the success factors** and the **contribution to the stakeholders' business goals and requirements**.

The **public private partnership** serves the product success factors best for the **information service**. The public model will provide better guarantee for the roadside deployment of VMS, but will less likely lead to in-vehicle deployment and the establishment of pan-European reservation portals.

The public private partnership is recommended as the most practical solution for establishing the TPA information service. It will however work only if

- § a solution is provided for the costs of collecting occupancy data by the TPA operators. This can be achieved by:
 - providing subsidy for the installation of counting systems

- providing subsidy for the operation of counting systems
- providing additional benefits for installing counting systems

§ a common standard is adopted for the publishing of occupancy data

§ a common understanding on the relevance of TPA-IRS is achieved through the signing of a covenant by public and private road and TPA operators, and that is open to associations of insurance companies, hauliers, truck drivers, and fleet management and navigation providers.

The best results in serving the product success factors for the **reservation service** achieve **the private model**. It is most likely to lead to fast deployment of the service in vehicles. It requires however TPA operators to co-operate in providing TPA information, and by actively processing booking requests.

The private model is recommended as the most practical solution for establishing the TPA reservation service. It will however work only if

§ a solution is provided for the costs of access control systems for TPA operators. This can be achieved by:

- providing subsidy for the installation of access control systems
- providing subsidy for the operation access control systems
- providing additional benefits for installing and operating a TPA reservation system

§ a common standard is developed and adopted for the processing of reservation requests

§ a business model is developed by private parties that will provide the proper benefit to TPA operators and users.

4.3.2.5. *RECOMMENDED ORGANISATIONAL SETUP*

The analysis has shown that the information service and reservation service have different technical and organisational requirements. Two different organisational setups

are therefore recommended; one for the information service, and one for the reservation service.

The **public private partnership (PPP)** is recommended as the most practical solution for establishing the **TPA information service**. The trusted 3rd party setup also fulfils the product success factors quite well. However, the more active involvement of public authorities in the PPP will more likely lead to a faster development and wider adoption of a data publication standard. Further, public authorities have an interest in making the information available in-vehicle and in back office systems which will also be easier to achieve in a PPP than a T3P setup.

The **private model** is recommended as the most practical solution for establishing the **TPA reservation service**. Reservation services can be operated at marginal costs for a large number of TPAs. Such a centralised service can be developed quickly and operated cost-efficiently by private parties.

4.3.2.6. ACCEPTANCE BY STAKEHOLDER GROUPS⁴

The possibility to obtain more information about free parking spaces and the occupancy of parking areas to obtain will be highly welcomed by the European **drivers**. Positive impacts of an information system are expected in fields of road safety and less parking search traffic. A lower priority is seen on information on additional services or facilities. Long haul drivers are very experienced and know the rest areas and parking places on their routes very well.

It is of particular importance that the information is on current level and constantly updated. Information dissemination on VMS along the highways is preferred. In vehicle information must be easy to retrieve and handle. Additional technical devices (besides the already existing) are not accepted. Information display must to be carried out on already

⁴ The approach for collecting the stakeholder views described hereafter is fully documented in deliverable D5e. This market acceptance check was done by a pragmatic approach whose results should not be considered as statistically founded.

The aim of this market acceptance check was to get an overview on reactions on the topic and a feedback on the possible business case, and to collect different opinions from different stakeholders on evaluated problems and topics of a European wide IRS and evaluation of the user acceptance.

These feedbacks have been balanced with others collected during the two workshops, for the elaboration of the conclusion and the final recommendations of this study.

excising units. A reservation system for truck parking places is judged to be difficult to implement by the drivers stakeholder group. This system has to consider that it is often difficult to forecast the time of arrival. In cases of congestion or other unforeseen occurrences the driver loses time and has to stop much earlier than planned because of driving time regulations. This presents also a handicap: the driver is under pressure to reach the reservation appointment. In most of the cases a reservation will be done via back office assistance.

The group of **road authorities and TPA operators** is the biggest one. Often road authorities are also the TPA operators and so responsible for issues of truck parking. Only the operator of the service areas and petrol stations are private companies. The rest stations besides the highway often are private operated. All in all, the feedback from these two different stakeholders is very similar so that they are merged together in this chapter.

Most of the interviewed people see the problem of missing parking space as a big problem, but they don't see a primary solution in ITS. In the near future an improvement of parking capacity is needed and this will be mainly solved by investment in additional parking slots on chosen areas. A lack of parking occurs primarily on large parking areas with good additional infrastructure and first of all in the evening hours. Smaller areas with less comfort still have capacities in peak times. Also the issue of security is not seen as a major problem. This problem is shifted more to the eastern and southern region of Europe and seems more a problem of insurance companies. The costs of investment and operation for an information system were a big discussion issue. Private TPA operators often argue only with their economic benefits but public operators also see the general benefits. Non-quantifiable information on effects are known but not expressed in direct benefits whether economic or general. This makes the reasoning for investments hard and requires further research. The implementation of a reservation service of truck parking spaces via private service providers but requires occupancy information and is connected with the above-named problems. The connection to a reservation system also brings disadvantages and conflicts the aims of the TPA operator who wants to utilise its capacities as best. In the case of a reservation the operator has to keep the appropriate capacity free, even in the event of delay or in the worst case of non-occupancy. It is difficult to enforce a business model that (as proposed) leaves the costs for implementation and operation only at the operator's side, although positive effects on the general public are generated as well. The opinion is that big problems in financing will occur, especially in the economically weaker Member States. At this point, subsidies and financial assistance from the EC are deemed necessary.

The stakeholder group of **hauliers** doesn't see the problems in field of security so much but in truck parking capacity problems. Particularly secure parking space is rarely necessary and the use is often too expensive. Therefore they would welcome a system on occupancy information on TPAs and see better working conditions for the drivers.

Hauliers prefer information dissemination via VMS because this solution is easiest to handle for the driver and not connected with additional in-vehicle equipment. At the hauliers side there is the clear statement that no additional technical equipment should be installed inside the truck because today drivers have to handle a lot of communication and technical devices. For the dissemination of information via existing devices (e.g. route guidance system) they are afraid of additional costs and the willingness to pay is very low especially if the information would be also available on road via VMS. The use of occupancy information also at back office is also welcomed but also if free of costs. In this line special occupancy forecasts would help to plan the trip more efficiently. The hauliers also prefer a reservation system for truck parking. They are willing to bear the costs but the reservation must be easy to handle and if costs don't get out of line. The competition on this market sector is very tough and the price is deciding. That's why additional costs play a big role. They welcome the possibilities of booking the parking place via the driver itself but also via a back office assistant.

The two problems of truck parking are affecting the insurance companies in different intensions. Missing parking places along the highways can lead to obstruction of traffic and later to accidents. For an **insurance company** every accident is a claim and for the concerned company and driver it is an unfortunate incident. For both an improvement of the current situation would be a great advantage. The high rate of thefts and aggression against drivers and trucks on parking places seems very disturbing. Insurance companies would welcome special secured parking places for their customers. In view of the annual costs of 8 billion EUR the insurer see quite a high potential for a particular bonus model. It would be a possible business case to connect an insurance bonus on using special secure parking places but this requires a European wide network of standardised secure parking places. A good cooperation between the operators of TPA and the insurance company is required.

In general **cargo owners** are interested in safety of their cargo but in most cases there are no special facilities needed or requested. The safety of goods is provided by haulier and so the risk is shifted to the haulier. In most cases the cooperation between haulier and cargo owner is based on long term contracts. Part of these contracts is the transport price and so it is fixed for long periods. Maybe that's why hauliers resist paying additional costs because they cannot pass that costs to the customer. In summary it was very surprising that most of the interviewed people don't see an urgent need for a reservation system of secure truck parking, but two aspects should be dissociated.

Truck parking reservation and information system

Most answers can be summarized under the following statement: Truck capacity problems are bigger than security issues.

So the problem of missing parking places on most important freight corridors is the question and the need to improve this situation because of traffic safety and the drivers working conditions is recognised. But the contribution of ITS solutions to address the capacity problems of truck parking spaces is called into question. There are very few polled people really believe that the high investment cost of such a system justify the benefits achieved. A further research on general and socio-economic benefits is needed.

But the service on occupancy information is welcomed by most of the stakeholders. This measure - separated from reservation service - is seen as an improvement of drivers working conditions and a more efficient route planning. But **here** dynamic and forecast instead of static information are desired.

Secure truck parking:

The security aspect of truck parking is not seen as a big issue in Central Europe at the moment and the majority of the respondents advances the view that at the moment the problem is overrated and there are more pressing problems in fields of ITS or freight transport.. The problem of cargo thefts and violence against drivers is more seen in regions of Eastern and South-eastern Europe. Therefore the development of a dense European wide network of secure parking places seems not needed. But the development of standardised secure parking places in more dangerous regions and "crime hotspots" are seen as an alternative way to a whole network. These special secured areas don't need a reservation system because today the utilisation of such areas is still not very high.

As a conclusion, the first priority is the reduction of the lack of parking lots and the implementation of secure parking places on special hot spots. The second priority is the implementation of a European wide information system on occupancy data. And last but not least based on the information system a reservation system can be developed.

But nevertheless in the next years there are already to set the scene for a European wide information and reservation system. But at the implementation level it should be considered that the needs of economically weaker Member States are not ignored.

5. Stakeholders' consultation

The aim of this workshop was to validate and discuss the draft results of the deliverables of part B of the study. On the one hand, the D5d outputs dealing with the analysis of efficient information dispatch concept and the assessment of truck parking reservation systems in the EU and on the other hand D5e outputs on a business model elaboration and its potential market acceptance. The workshop is in fact part of the study so the inputs of the participants were considered important and interactivity was highly encouraged.

The workshop was organised into an introductory part and 2 main thematic sections:

- § **Introduction of moderator and then EC agenda** in the area of truck parking information and reservation system
- § **Session 1:** Building a European truck parking information and reservation system: Key findings and recommendations of the EU study, Overview on existing truck parking information systems - How are they operated, success factors and obstacles - , Truck parking reservation system of Highway Park - Success factors and lessons learned.
- § **Session 2:** Business Case of an information and reservation system and market acceptance check: Key findings and recommendations of the EU study. Intelligent Truck Parking from the perspective of a Member State. The CVIS project and the cooperative truck parking application.

The workshop was attended by a number of key stakeholders concerned by truck parking information and stakes from the side of the EU, national administrations, road operators - public and private, information and reservation providers, specialist consultants and academics.

Presentations of stakeholders along with panel discussions along the workshop outlined the following conclusions and recommendations:

- § There is a switch from a demand-type of "parking area market" to a supply-type market
- § Truck parking areas operators should be equipped to follow slot occupancy

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- § Truck parking areas information system should be automatically linked to TRANSPark and roadside e-signs
 - § There is a need to solve the legal framework incoherence
 - § Real time occupancy data in forecast calculation should be made available
 - § Interfaces between parking gate systems and in navigation systems may be developed
 - § A set of minimum mandatory functions should be defined
 - § Integration of TPA in other ITS services should be encouraged
 - § Reservation services should be made more profitable for transport business suppliers maybe through the addition of complementary services for customers
 - § Further research on socio-economic effects is needed
 - § Subsidies and financial assistance from the EC are needed
 - § Evaluation of willingness to pay for reservation is needed
 - § More deployments are needed to reduce the cost of requested technology

The event generated a positive feedback from the stakeholders who were grateful to pursue the exchanges initiated during the first workshop concerning the ITS Directive.

6. Conclusions

Key information for building a financial business model is scarce. Limited information is available on the implementation and operational costs of TPA information and reservation services, and research on the willingness to pay for TPA-IRS remains sketchy. The study had to adopt a qualitative approach to building the business model, focusing mainly on the form of organisation. A number of organisational scenarios were described. Each scenario was tested against the stakeholders' requirements and business goals, as well as the critical success factors of the services themselves.

What is clear is that truck drivers and hauliers would welcome better information on TPAs, and in a second step the option to make reservations. The willingness to pay for occupancy information by truck drivers as well as hauliers is however very low. Although the available research is sketchy there appears to be a niche market willingness to pay for the reservation service, as is demonstrated by the relative success of the emerging reservation service of HighwayPark.

Member states and lower level public authorities appear to be reluctant to invest in TPA-IRS. The workshops and the acceptance survey have shown that their main concern is TPA capacity shortage in the main economic regions. The costs for the implementation of TPA-IRS infrastructure are a fraction of the costs for expanding TPA capacity but the benefit of TPA-IRS not clear. The socio-economic business case therefore needs to be substantiated before a serious commitment from public authorities can be expected.

Uniform real-time information on the truck parking facilities along the TERN, would certainly increase the TERN's perceived level of service. It is also likely to lead to:

- § improved use of the TPA capacity by spreading the load in spatial and temporal terms, although clear research data is lacking.
- § less off-site parking, which indirectly contributes to road safety and security from theft and robbery.

As such the EU would benefit from the introduction of TPA-IRS.

As is demonstrated by the initiative of ANIA in Italy, insurance companies have a clear interest in their customers parking trucks in secure parking facilities. This can only be achieved by making information on TPAs available to drivers and hauliers, and can be further encouraged by providing reservation services.

TPA reservation systems are only useful when access control systems are installed at the TPA, and the TPA is properly fenced. Access control systems automatically are able to

provide occupancy information. At less secure TPA, occupancy information can be collected with less costly equipment. Deployment of TPA information services and TPA reservation services should therefore be treated as separate projects.

A clear organisational setup is required that will facilitate the installation of counting and access control systems at TPA by balancing the interests of all stakeholders.

Several private initiatives have developed to bring TPA information to in-vehicle and back-office systems. By standardising the publication of TPA information, these initiatives will be able to be developed further, and new content aggregators may emerge. These organisations can become the service providers that aggregate and publish occupancy information to in-vehicle systems.

The key issue in the establishment of a TPA information service is the collection of occupancy data. Though the counting systems should run unattended, commitment from a local party, i.e. TPA operator, for basic maintenance and calibration is required to guarantee continuous operation.

TPA operators are reluctant to invest in counting systems. The implementation and operational costs are substantial while the perceived benefit to the operator is limited. Private TPA operators will argue that publishing their occupancy will not increase occupancy, it might even reduce occupancy.

Public TPA operators are more concerned with expanding the TPAs capacity than adding services. The willingness to invest in the implementation and operation of counting systems is limited because the socio-economic business case is not sufficiently substantiated.

As long as the costs for implementing counting systems outweigh the expected socio-economic benefits for the TPA operator, it is unlikely that occupancy information will become available in sufficient detail.

New ways of collecting occupancy information more cost-effectively should therefore be investigated, e.g. based on floating vehicle data. The adaptation of the digital tachograph could provide an opportunity to introduce such a system. If many trucks would report their position to roadside systems, determining the occupancy of TPA would become a straightforward exercise. It would also allow for a service that would charge for TPA-use based on actual use. The final report on the open in-vehicle platform (action 4.1 of the ITS Action Plan) describes a migration path that would allow for such a system.

In the short term, a model is required that will provide TPA operators with an incentive to publish static TPA info, and install and maintain automated systems for reporting occupancy.

There are various ways of promoting this:

1. Provide additional benefits; such as
 - a. Statistical information on the TPA visitors
 - b. (Free) promotion of their TPA to registered truck drivers and hauliers
2. Make publication of occupancy data a condition for the higher levels of the LABEL categories
3. Encourage insurance companies to provide discounts
4. Subsidise implementation and operation of counting systems
5. Make publication of occupancy data mandatory for TPA on the TERN

Contrary to the TPA information service, reservation services do not have to rely on automated systems. Reservation requests can be processed manually by TPA operators, which mean investment requirements are limited. However, to effectively deal with reservations, a TPA requires some form of access control, so reservation services should primarily be intended for secure TPA.

Key issue in the deployment of TPA reservation services is the lack of a common standard for handling reservation requests. Such a standard is neither available nor under development.

Several private initiatives have developed a platform that offers a TPA reservation service, in-vehicle and in back-office systems. All services rely on proprietary IT implementations, which can in the future severely restrict interoperability. By standardising the reservation process at the TPA-level, these initiatives will be able to be developed further, and new service aggregators may emerge.

As demonstrated by HighwayPark, truck drivers and hauliers are willing to pay for reservation services. Insurance companies also derive a direct benefit from customers that make reservations at secure TPA. By balancing the interests of the truck drivers, TPA operators and insurance companies it should be possible to develop a viable business model for TPA reservation services by private parties.

For example:

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- § Reservation service providers could provide a kickback fee to TPA operators for handling reservation requests
 - § Insurance companies could fund a discount scheme that would encourage their customers to make reservations on secure TPA

Combined product propositions can best be developed by private companies. It is therefore essential that TPA reservation services are operated by private companies. The development of various initiatives in Germany suggests there is a viable business case for commercial reservation services.

To facilitate such services, market barriers need to be removed:

- § A common standard for handling reservation requests needs to be developed
- § A clear classification of TPA in terms of security and facilities is required (i.e. implementation of the LABEL classifications)
- § A larger number of secure TPA on the TERN would facilitate the development of reservation services. Clear goals should be set, e.g. a secure TPA every 50km in freight crime prone areas.

7. Key recommendations for next steps

In general the socio-economic benefits of TPA-IRS are assumed to be clear, this however is questionable. Despite the relative limited costs for installing and operating equipment for occupancy monitoring and reservation processing, public authorities in member states are sceptical on the socio-economic business case of TPA-IRS. Additional research is required.

- § A study assessing the effectiveness of TPA-IRS in combating off-site parking. This study should quantify current socio-economic effects of off-site parking, detailed breakdown of required investments and operational costs for the establishment of TPA-IRS per TPA, effectiveness of TPA-IRS in reducing off-site parking and in increasing TPA occupancy rates
- § Market research collecting socio-economic data in various member states from all key stakeholders: drivers, hauliers, private and public road authorities and TPA operators. The study should quantify:

Truck drivers:

- Need for TPA static and occupancy information service in-vehicle
- Willingness to pay for TPA static and occupancy information service in-vehicle
- Need for TPA reservation service in-vehicle
- Willingness to pay for TPA reservation service in-vehicle

Hauliers:

- Need for TPA static and occupancy information service in back-office
- Willingness to pay for TPA static and occupancy information service in back-office
- Need for TPA reservation service in back-office
- Willingness to pay for TPA reservation service in back-office

TPA operators:

- Expected benefits, drawbacks and business impact of publishing TPA occupancy information

- Expected investment in TPA occupancy data collection
- Expected operational costs of TPA occupancy data collection
- Expected investment in TPA reservation system
- Expected operational costs for TPA reservation system

Public and private road authorities:

- Expected benefits, drawbacks and business impact of TPA occupancy information and reservation service
- Willingness to invest in VMS system for publishing occupancy information
- Expected operational costs of VMS system for publishing occupancy information

- § Develop TERN-TPA development plan and introduce TERN service level classification
- § The definition of what is a TPA for which information is required and the specification of required information and level of information quality.
- § Initiate and support PPP model for TPA information services, an EU covenant should be drafted that will assure:
 - That public road authorities will make basic static data for all TPAs and occupancy data (where it is required) openly available on all publicly operated TPA along the TERN in a standardised format
 - That public road authorities will stimulate and support private TPA operators along the TERN in the collection and publication of basic static site and occupancy data in a standardised format
 - That key industrial parties such as leading fleet management and navigation solution providers make the information available in haulier back offices and truck cabins
 - Promotion of TPA-IRS by associations of hauliers and truck drivers
 - Development of TPA information services by different public and private market players will be enabled and encouraged and in particular not be inhibited by TPA data availability restrictions

- Creation of a European register of published truck parking data sources

- § Stimulate establishment of national TPA information portals
- § Make LABEL TPA classification mandatory for the purposes of providing site information
- § Increase the number of secure TPA
- § Ban offsite parking
- § Consult all stakeholders

For truck parking area **information services** the following steps are needed:

- § Stimulate adoption of a common standard for publishing occupancy information
- § Use the opportunity of the revision of the digital tachograph to collect TPA occupancy data
- § Research reliable and cheap methods of determining truck park occupancy (FCD, FVD,)
- § Stimulate the implementation and operation of counting systems

Truck parking area **reservation services** require the following points:

- § Standard for parking reservations
- § Encourage TPA information availability
- § Involve associations of insurance companies

No technological hurdles exist that cannot be surmounted to establish a pan-European truck parking information and reservation service. The organisational and business model that is chosen will determine to a large extent the chances of success.

An important enabler for a successful business model will be the definition and adoption of common standards for the automated publishing of coded information by parking operators, and the processing of reservation requests.

Once approved as standard, TPEG-PKI could be used as basis for the information service. DATEX II is also a strong candidate but requires a truck parking data extension to be tested and accepted. The adoption of an open standard to stimulate dissemination of static and occupancy data will allow the local use for roadside VMS, as well as allow for the aggregation of information from multiple sites.

The deployment of TPA information and reservation services can be promoted by supporting the deployment of a universal open online in-vehicle unit in commercial vehicles. This would provide a platform not only for the presentation of TPA features and occupancy, but also for making reservations directly at a TPA by drivers. In addition the mass deployment of such a platform would enable the effective harvesting of TPA occupancy data through floating car data.

Additional research could be undertaken to determine whether it would be possible to calculate TPA occupancy using cellular reference data.

8. Glossary of acronyms

Alert-C	Communication protocol used for communication within TMC, which is a simplification of DATEX
BO	Booking Operator
CRS	Computer Reservation System
DAB	Digital Audio Broadcasting
DATEX II	Transport data exchange standard primarily for communication between TMCs as successor to DATEX
DoT	Department of Transport
DSCR	Dedicated Short Range Com
EASYWAY	EU co-funded implementation harmonised coordination project for ITS on TEN-T with over 20 member state members
EC	European Commission
EU	European Union
HGV	Heavy Goods Vehicles
ICT	Information and Communication Technology
IEEE	Institute of Electrical and Electronics Engineers
IOIS	Inter-Organisational Information System
IRS	Information and reservation system
ISO	International Organisation for Standardization
ITP	Intelligent Truck Parking
ITS	Intelligent Transportation Systems
IVE	In-vehicle equipment
LABEL	EU co-funded research and demonstration project on certification of secure TPAs
OBE	On-Board Equipment
On-shore system	Contrary of an in-vehicle or on-board system; roadside systems or back office systems
PPP	Public private partnership
RDS-TMC	Radio-Data-System / Traffic-Message-Channel
SETPOS	Secured European Truck Parking Operational Services
SP	Service Provider

SWOT	Strengths, Weaknesses, Opportunities, Threats
T3P	Trusted 3 rd party
TERN	Trans-European Road Network
TPA	Truck Parking Area
TPAO	Truck Parking Area Operator
TPEG	Transport Protocol Expert Group
TPI	Truck Parking Information System
VMS	Variable Message Sign