ITS ACTION PLAN

FRAMEWORK SERVICE CONTRACT TREN/G4/FV-2008/475/01

ITS Action Plan – Priority Actions E and F - Information and Reservation Services for Safe and Secure Parking Places for Trucks and Commercial Vehicles

D5 –Final Report

Paris, 19.12.2012
20121219_ITSAP_prioEF_Final_Report.doc

EUROPEAN COMMISSION
Directorate-General for Mobility and Transport
Unit C3
Rue J.-A. Demot 28, 07/088
B-1040 Brussels
Belgium

Peter Rapp
peter.rapp@cbconseil.com

Administrative contact :
Caroline Cottin
caroline.cottin@algoe.fr

VERSIONING AND CONTENT REVIEW INFORMATION TABLE

Version	Date	Author	Reviewer	Remarks
D4 v1.0	29.10.2012			Draft Final Report approved on 14/11/2012
D5 v1.0	22.11.2012	HC, KGF	PMR	Translations of Executive Summary
D5 v1.1	19.12.2012	PMR		Processing of final EC comments

CONTRIBUTORS

Name	Company
Peter M. Rapp (PMR)	Carte Blanche Conseil
Hugo Chauvin (HC)	Carte Blanche Conseil
Simon Bohne	Rapp Trans AG
Ian Wilkinson (IW)	Rapp Trans (UK) Ltd.
Tom Van de Ven (TVV)	Rapp Trans NL
Karl-Gerhard Freyer (KGF)	Rapp Trans DE

T A B L E O F C O N T E N T

E X E C U T I V E S U M M A R Y

Background

The ITS Directive (2010/40/EU) includes six priority actions for which binding specifications need to be elaborated. Two of these actions are the provision of information and reservation services for safe and secure parking places for trucks and commercial vehicles.

Specifications are needed to ensure services emerge that will contribute to optimising use of existing capacity for truck parking in service and rest areas on roads. These specifications are due to be adopted by the European Commission by end 2012 and by end 2013, for information and reservation services respectively, and they shall be supported by a cost benefit analysis.

The European Commission has appointed contractors to undertake a work programme in support of the production of the impact assessment and draft specifications. This document is the final report, which presents:

- the findings of the stakeholder consultation conducted in support of the impact assessment and draft specifications,
- the evidence collected in support of the impact assessment,
- SWOT analyses for data coding standards and dissemination channels,
- the deployment options submitted to the impact assessment,
- the analysis and comparison of these options,
- a proposal for monitoring indicators and means,
- the resulting conclusions and recommendations.

Consultation of Stakeholders

Feedback from stakeholders was gained using three methods:

- A public on-line consultation, which received 86 responses,
- 15 interviews with stakeholders from all parties, conducted mainly face-to-face,
- A stakeholder workshop with 63 participants.

The range of stakeholders includes:

- Public (association of) road authorities, public/private (association of) road operators

- Parking area providers, parking area operators (public/private)
- Unions of truck drivers,
- Associations of hauliers,
- Insurance companies,
- Police forces
- Cargo owners,
- Information service providers, reservation service providers,
- Content and service aggregators
- Navigation and fleet management solution providers
- Petrol Card providers,
- Truck manufacturers
- Parking equipment suppliers.

The consultation has shown that the stakeholders support the problem definition and its consequences. They add that:

- There are high-demand and low-demand areas. Location is the primary factor for high parking occupancy. The capacity strain can be felt in conurbations in particular. It will grow in tendency, since demand grows faster than capacity.

- The market segment of high value cargo transportation does sometimes require parking areas with high security equipment. This market segment is limited.

- The decision where to park is mainly taken by the drivers, who, if not informed on parking possibilities, would prefer to respect working time regulations and may then park off-site.

Stakeholders report experiments with VMS that have shown good results in terms of parking usage distribution when information is provided for several successive safe and secure truck parking areas (s+sTPA). Yet Member States, in particular, remind that reliability and the cost/benefit ratio of this information should be proven. According to road operators, the provision of dynamic information should primarily be deployed on limited spatial scales in a specific corridor or area, where there is a strong potential for optimising occupancy.

Evidence in Support of the Impact Assessment

Fatal and Injury Accidents
A specific analysis, conducted by the European Centre of Studies on Safety and Risk Analysis, has concluded on an estimate of 44 lives and 1,430 injuries per year that can be ascribed to offsite parking of trucks. The estimate represents the potential saving that could be reached if offsite parking of trucks would disappear at all. Drowsiness and vehicle failure are identified as further relevant accident factors in the context of safe and secure truck parking.

The actual saving through measures in favour of effective utilisation of safe and secure truck parking areas will be only part of the potential saving. It will be estimated for each deployment option, based on assumptions of how much HGV travelling is undertaken on roads where s+sTPA information and reservation services are offered, and on how many off-site parking, drowsiness and vehicle failure events would be eliminated.

Economic loss due to theft
The analysis of available sources shows that monetary loss in the EU from freight crime can only partially be quantified, and that the comparison of figures from different countries does not result in a consistent picture. Although it is clear that the losses from cargo theft are potentially substantial, the available evidence does not illustrate a clear, quantifiable link between crime and truck parking. It is unclear whether implementing information and reservation services for secure truck parking is capable of reducing economic loss, and by how much. Therefore the economic impact of losses due to thefts is not quantitatively evaluated in the present study.

Costs
Indicative costs were enumerated, providing a basis for the cost/benefit analysis. The costs of data collection are particularly uncertain because the technologies and their markets are not mature.

Analysis of Strengths, Weaknesses, Opportunities and Threats

The SWOT analyses are used to help define the deployment options for the impact assessment, and in the development of the specifications.

Data coding standards
21 criteria were used in the SWOT assessment of 4 data coding standards that have the potential to be used to code truck parking information and/or

describe and process truck parking reservations (viz. RDS-TMC, DATEX-II, TPEG and ISO/NP 15638-19).

In short, both DATEX-II and TPEG were found to provide a good solution for the coding of TPA information, but neither allows for the definition and processing of reservation requests.

Distribution channels
17 criteria were used in the SWOT assessment of 11 distribution channels that could be used to disseminate truck parking and/or reservation information (e.g. roadside VMS, data casting, truck radio station, digital TV, mobile internet, information booths). The analysis considered deployment on TERN, motorways and secondary roads.

DAB/TPEG or DVB-S/TPEG data casting, DVB-SH data communication and Mobile internet were found to be suited for TPA information services, However, each has specific pros and cons that might become significant in future (depending on factors external to ITS), so selecting one specific, preferred channel should be avoided. Mobile Internet has a large installed base, serving all types of in-vehicle device, but the risk of driver distraction needs to be addressed through appropriate HMI applications. Road side VMS and electronic information booths could supplement other direct-to-cab channels.

Elaboration of Deployment Options

Working from the high-level problem definition and core policy objective, 9 specific objectives are set out. The 7 deployment options considered in the impact assessment (one of which is a baseline/ do nothing option) are characterised by the degree and nature of any EU intervention aimed at delivering these specific objectives.

Id	Description
I.	• Baseline Scenario – No EU intervention
II.	• Specifications for voluntary deployment of static database • Dissemination to end users is left to MS • Deployment of additional, dynamic ITS in priority zones is left to MS
III.	• Specifications for voluntary deployment of static database, including provisions for dissemination through service providers • Specifications for voluntary deployment of additional, local dynamic ITS in priority zones where capacity can be used more efficiently and this circumvents negative impacts leading to avoidance of the zone
IV.	• Specifications for mandatory deployment of static database • Dissemination to end users is left to Member States • Deployment of additional, dynamic ITS in priority zones is left to MS
V.	• Specifications for mandatory deployment of static database, including provisions for dissemination through service providers • Specifications for mandatory deployment of additional, local dynamic ITS in priority zones where capacity can be used more efficiently and this circumvents negative impacts leading to avoidance of the zone
VI.	• Option III. + Specifications for voluntary deployment of reservation services
VII.	• Option V. + Specifications for voluntary deployment of reservation services

Table: Summary of deployment options.

Analysis and Assessment of Impacts, Risks, and Compliance with the Principles Set Out in the ITS Directive

Economic, Social, Environmental Impacts

Impacts were assessed and ranked against the baseline option. Overall, the intervention options all represent an improvement relative to the baseline, with neutral or positive impacts in all areas. Some negative economic impacts were identified in options where specifications lead to mandatory deployment, but these were outweighed by the other positive economic effects e.g. on the internal market and industry competitiveness. Social and environmental impacts were significant only in options where specifications lead to mandatory deployment. Once dynamic information is effective in priority zones, the additional benefit of reservation is still questionable.

Impacts on Stakeholders

Impacts were assessed and ranked against the baseline option. The rankings were positive or neutral for all stakeholders except TPA Operators. Their co-operation is critical for collecting occupancy data, but doing so increases their investment and operational costs. The impacts were significant only in options where specifications lead to mandatory

deployment, and particularly for dynamic information in terms of impacts on road authorities and hauliers. Again, the additional benefit of reservation services is questionable once dynamic information is mandatorily deployed in priority zones.

Impacts on Existing Markets and Services
The expected market evolution induced by each deployment option has been described in qualitative terms. It is observed that information and reservation services for truck parking are expected to be a minor application in the wider context of the markets for communication between vehicles and central services, and for mobile and in-vehicle devices. Hence they should be expected to adapt to the big trends in these markets without influencing them significantly.

Further Aspects
The analysis has addressed special impacts, risks, and the compliance with the principles set out in the ITS directive. These aspects raise specific issues for some options, and recommendations for optimising the specifications.

In support of the cost-benefit analysis, a monetary estimate of costs and benefits of the deployment options has been elaborated. This is described in detail in an appendix to the present report. The estimate is built on a number of assumptions, where little or no evidence exists. This is partly due to the fact that experimentations and pilot projects have just started and few evaluations are available for the moment. Therefore, the estimates summarised in the table below must be considered as orders of magnitude (figures are rounded).

Deployment Option	Estimate of benefit [M€/year]	Estimate of cost [M€/year]
Baseline	0	0
IV. (mandatory static information)	80	4
V. (IV.+ mandatory dynamic in priority zones)	160	25

Table: Quantitative estimates of costs and benefits.

Comparison of Options and Recommendations

Option I. is the “do-nothing” scenario. It does not eliminate the inefficient use of truck parking capacity. The trend is that the situation will worsen. All further options have a positive impact as compared to this baseline.

Options II. to VII. foresee the voluntary or mandatory deployment of information and reservation services by means of European specifications. The main conclusions of the analysis are:

- The impacts are strongly related to the mandatory character of the deployment. Voluntary deployment yields small impacts only.
- The most positive impacts are related to road safety, and to the working conditions of drivers. Main beneficiaries are, consequently, the public authorities and the drivers. The economic impacts are also positive, and benefit mainly the hauliers. There are positive impacts for the environment.
- The benefits are small or nil for further stakeholders (TPA operators, cargo owners, insurers). The most critical situation concerns the TPA operators, because their co-operation is critical for collecting data and for handling reservations.
- The pairwise comparison of the respective options with and without reservation (III./VI. and V./VII.) shows that once dynamic information is effective in a priority zone, the additional benefit of reservation services is questionable, for parking operators and hauliers in particular.
- Extensive static information and dynamic information in priority zones is cost-effective. For reservation services, the evidence for assessing cost-effectiveness is insufficient.

Options V. and VII. result as preferable options.

Option V., which is characterised by mandatory extensive deployment of static information and mandatory selective deployment of dynamic information, can be seen as a necessary intermediate step towards Option VII.

Option VII includes voluntary deployment of reservation services in addition to what is in Option V. Considering that expectations towards reservation services are still quite heterogeneous, that the development of standards for reservation transactions is still in an early status, and the need to ensure consistency between dynamic information and reservation, it is recommended to prefer Option V in a first step.

The analysis of trade-offs and synergies yields the following recommendations:

- The deployment of static information should be extended to all TPAs that serve the truck traffic on the TERN. The scope should include specialised truck parking areas as well as multi-purpose areas that offer truck parking as a function among others.

- The selection of priority zones for the deployment of dynamic information should search synergy with other ITS traffic management measures.
- The specifications for reservation services should leave room for a wide range of needs and situations: on-trip bookings as well as pre-trip bookings.

The assessment of special impacts yields the following hints for optimising the specifications:

- Make sure that reservation services benefit to drivers as much as to their employers, by minimising the hassle of transactions and the additional constraints for drivers (options V. and VII.).
- Include requirements on reliability of dynamic data and on rules for proceeding in case of malfunction.
- Include harmonised rules for cancellations and penalties for no-shows (options VI. and VII.).
- Adopt simple criteria for the identification of priority zones where the implementation of dynamic information is mandatory (options V. and VII.).
- Scope the specifications on reservation services in a way that grants optimal cost-effectiveness. Further study might be required.

For optimal compliance with the principles set out in the ITS Directive, the specifications may eventually be enhanced by:

- Ensuring that adjacent Member States concerned by ITS parking priority zones located along cross-border transport corridors exchange information on their deployment plans for dynamic information services, and are encouraged to cooperate for an optimal continuity of service.
- Ensuring sufficient flexibility or time lapses for allowing existing legacy systems to be renewed in accordance with their own lifecycle.
- Ensuring that a single standard for handling reservation requests is prescribed, in order to prevent the risk of diverging developments.
- Considering the vicinity of important intermodal terminals among the criteria for identifying priority zones for ITS parking.

This risk assessment yields the following hints for eventually optimising the specifications:

- For static data, the specifications should make sure that all TPA operators are effectively pushed to comply with the obligation of declaration and with the data quality requirements.
- For dynamic data, the pattern of risks is such that a combination of scarce funds and of conflicting priorities between concerned actors

might stall a deployment initiative in any priority zone. In order to prevent this situation, it might be opportune to include in the specifications not only a clear assignment of the obligation of results to one type of actor (e.g. the Member States), but also a default split of costs.

- For reservation services, the specifications should ensure that dynamic information and reservation services follow consistent objectives in priority zones, and that TPA operators have the greatest possible freedom when it comes to handling the reservations on-site (e.g. choice of automatic and manual means, implementation on specialised truck parking areas as well as on areas for mixed public, …).

The deployment options foresee effective accessibility and re-use of TPA data for service providers. Static data should be free of charge for service providers, while dynamic data could be subject to a fee and/or to conditions of re-use. The way of ensuring equal access to data for all service providers should be explicitly addressed when drafting the specifications.

Monitoring and Evaluation

A set of ex-post monitoring indicators for evaluating the long-term effects of the specifications is proposed. It is recommended:

- To use all or only a selection of the indicators, depending on what aspects are considered most relevant, and also on available inputs in order to ensure a sufficient representativeness for the analysis while taking into account that resources for monitoring are often limited.
- To allocate the collection of the indicators, depending on the means to be used, partly to the Member States, who should provide the results in the general framework of their reporting related to the ITS Action Plan, and partly to the European Commission.

S Y N T H E S E

Contexte

La Directive STI (2010/40/UE) comporte six actions prioritaires pour lesquelles des spécifications contraignantes doivent être élaborées. Deux de ces actions sont la mise à disposition de services d'information et de réservation concernant les aires de stationnement sécurisées pour les camions et les véhicules commerciaux.

Les spécifications sont nécessaires pour assurer le développement de services qui contribuent à l'utilisation optimisée des capacités de stationnement pour les camions sur les aires de repos et aires de services du réseau routier. Ces spécifications pour les services d'information et de réservation devraient être adoptées par la Commission Européenne respectivement vers la fin de l'année 2012 et vers la fin de l'année 2013, et seront accompagnés d'une analyse coûts-avantages.

La Commission Européenne a confié à des prestataires l'exécution d'un programme de travail pour soutenir la réalisation de l'analyse d'impact et l'avant-projet des spécifications. Le présent document en est le rapport final, et expose :

- les résultats de la consultation des diverses parties prenantes
- les données et informations collectées pour l'analyse d'impact
- l'analyse «SWOT» (forces, faiblesses, possibilités, menaces) des normes de codages de données et des canaux de diffusion
- les options de déploiement soumises à l'analyse d'impact
- l'analyse et la comparaison de ces options
- une proposition d'indicateurs et moyens de suivi des objectifs
- les conclusions finales et les recommandations.

Consultation des parties prenantes

Durant ce travail, les parties prenantes ont été interrogées de plusieurs manières,

- par une consultation publique en ligne, récoltant 86 réponses,
- à travers 15 entretiens, réalisés principalement en face à face, auprès de parties prenantes variées,
- et lors d'un atelier spécifique regroupant 63 participants.

Le champ des parties prenantes concernées est le suivant:

- (Association d') autorités routières publiques, (association d') exploitants publics ou privés de réseau routier,
- Propriétaires et opérateurs d'aires de stationnement (public ou privé),
- (Syndicat/Association de) conducteurs de poids lourds,
- (Association de) transporteurs routiers,
- Compagnies d'assurance,
- Forces de police,
- Chargeurs,
- Prestataires de services d'information, de réservation,
- Agrégateurs de contenus et de services,
- Prestataires de services de navigation et de gestion de flotte,
- Fournisseurs de cartes pétrolières,
- Constructeurs de poids lourds,
- Equipementier d'aire de stationnement.

La consultation a montré que les parties prenantes soutiennent la définition du problème et de ses conséquences. Ils ont également ajouté que :

- Il existe des zones à forte demande et des zones à faible demande de stationnement. La localisation du site est le principal facteur d'une occupation élevée. Les contraintes de capacité se font particulièrement sentir aux abords des agglomérations urbaines. Cette tendance est à la hausse, car la demande évolue plus rapidement que les capacités.

- Le segment de marché des chargements de grande valeur nécessite parfois des aires de stationnement très sécurisées. Ce segment de marché est limité.

- Les conducteurs de poids lourds décident majoritairement eux-mêmes où ils se garent. Dans les situations où ils n'ont pas connaissance des possibilités existantes de stationnement, ils préfèreront respecter les réglementations sur leur temps de travail et stationneront alors vraisemblablement en dehors des places autorisées.

Les expérimentations menées par des parties prenantes comportant l'installation de PMV diffusant de l'information sur la disponibilité de plusieurs aires de stationnement sécurisées ont montré de bons résultats en matière de répartition de l'utilisation de la demande de stationnement. Toutefois les Etats membres, en particulier, ont rappelé que la fiabilité et le rapport coût bénéfice de cette information doit être prouvé. Enfin selon les

exploitants de réseau routier, la mise à disposition d'information dynamique doit prioritairement être déployée sur des corridors ou zones spécifiques couvrant une zone géographique restreinte, où il existe un fort potentiel d'optimisation d'occupation des aires de stationnement.

Données et informations collectées pour l'analyse d'impact

Accidents mortels ou entrainant des blessures corporelles
Une analyse spécifique réalisée par le CEESAR (Centre Européen d'Etudes de Sécurité et d'Analyse des Risques) permet d'estimer que le stationnement illicite des poids lourds est la cause de 1 430 blessés et coûte la vie de 44 personnes chaque année.

Cette estimation représente l'économie potentielle totale qui pourrait être atteinte si le stationnement illicite des poids lourds devenait nul. L'hypovigilance/l'endormissement des conducteurs et les défaillances des véhicules ont également été identifiés comme des facteurs accidentogènes dans le contexte du stationnement.

L'économie réelle atteignable par les mesures en faveur d'une utilisation efficace de l'offre de stationnement existante, ne représentera qu'une part de l'économie potentielle totale.

Elle sera estimée pour chaque option de déploiement, en se basant sur des hypothèses relatives au nombre de transports routiers disposant de services d'information et de réservation et à leurs impacts en termes de réduction du stationnement illicite, de l'hypovigilance des conducteurs et des défaillances des véhicules.

Pertes économiques dues aux vols de marchandises et de véhicules
L'analyse des sources disponibles montre que les pertes monétaires dues à la criminalité liée au transport de marchandises dans l'Union Européenne ne peuvent être quantifiées que partiellement, et que les chiffres sur différents Etats ne donnent pas une image cohérente. Bien qu'il soit clair que ces pertes sont potentiellement considérables, les données disponibles n'illustrent pas un lien clair et quantifiable entre cette criminalité et le stationnement des poids lourds. Il est incertain que la mise en œuvre de services d'information et de réservation pour le stationnement sûr et sécurisé des poids lourds soit en mesure de réduire ces pertes économiques et dans quelle proportion. Ainsi l'impact économique des pertes liées au vol n'a pas été évalué quantitativement dans la présente étude.

Coûts
Des coûts indicatifs de mise en œuvre ont été répertoriés afin d'établir la base de l'analyse coûts bénéfices. Les coûts de collecte de ces données sont particulièrement incertains car les technologies et leurs marchés ne sont pas matures.

Analyse SWOT (Forces, Faiblesses, Possibilités et Menaces)

L'analyse SWOT est utilisée pour aider à la définition des options de déploiement de l'analyse d'impact, ainsi qu'au développement des spécifications.

Normes de codages de données
21 critères ont été utilisés dans l'analyse SWOT de 4 normes de codages de données qui ont le potentiel d'être utilisé pour coder les informations relatives au stationnement des poids lourds et/ou pour décrire et traiter les réservations relatives au stationnement des poids lourds (à savoir RDS-TMC, DATEX-II, TPEG et ISO/NP 15638-19).

En résumé, DATEX-II et TPEG sont de bons candidats pour le codage de l'information relative au stationnement des poids lourds, mais aucun des deux ne permet la définition et le traitement des requêtes de réservations.

Canaux de diffusion
21 critères ont été utilisés dans l'analyse SWOT de 11 canaux de diffusion qui ont le potentiel d'être utilisés pour diffuser des informations relatives au stationnement des poids lourds et/ou des réservations relatives au stationnement des poids lourds (à savoir PMV, diffusion de données, Stations de radios dédiées, télévision numérique, Internet Mobile, kiosque d'information). L'analyse a considéré un déploiement sur le TERN, les autoroutes et les routes du réseau secondaires.

La diffusion de données par DAB/TPEG, DVB-S/TPEG, DVB-S/SH et par l'Internet mobile est appropriée pour des services d'information relatifs au stationnement des poids lourds. Cependant chacun de ces canaux possède des avantages et des inconvénients spécifiques qui pourront devenir prépondérants dans le futur (en fonction de paramètres extérieurs aux STI), c'est pourquoi il doit être évité de choisir un canal de diffusion préférentiel.

L'Internet mobile possède un taux d'équipement très important, à travers de nombreux équipements embarqués, mais le risque de distraction du conducteur doit être maîtrisé par des interfaces Homme-Machine appropriées.
Les panneaux à messages variables et les kiosques d'informations électroniques peuvent servir à compléter les informations apportées par d'autres canaux directement en cabine.

Elaboration des Options de déploiement

A partir de la définition du problème et de l'objectif central, 9 objectifs spécifiques sont établis. Les 7 options de déploiement considérées dans l'analyse d'impact (dont une représente l'option de référence, ou statu quo) sont caractérisées par le degré et la nature de l'intervention de l'UE visant à atteindre les 9 objectifs spécifiques.

N°	Description
I.	• Scénario de Référence – Aucune intervention de l'UE
II.	• Spécifications pour le déploiement volontaire de bases de données statiques • La diffusion aux utilisateurs finaux est laissée aux choix des Etats membres • Le déploiement de services additionnels et temps réel sur des Zones Prioritaires est laissé aux choix des Etats membres
III.	• Spécifications pour le déploiement volontaire de bases de données statiques, incluant leur diffusion via des fournisseurs de services d'information • Spécifications pour le déploiement volontaire de services additionnels et temps réel sur des Zones Prioritaires, là où il existe un potentiel d'optimisation et où les impacts négatifs peuvent être évités
IV.	• Spécifications pour le déploiement obligatoire de bases de données statiques • La diffusion aux utilisateurs finaux est laissée aux choix des Etats membres • Le déploiement de services additionnels et temps réel sur des Zones Prioritaires est laissé aux choix des Etats membres
V.	• Spécifications pour le déploiement obligatoire de bases de données statiques, incluant leur mise à disposition pour la diffusion via des prestataires de services d'information • Spécifications pour le déploiement obligatoire de services additionnels et temps réel sur des Zones Prioritaires, là où il existe un potentiel d'optimisation et où les impacts négatifs peuvent être évités
VI.	• Option III. + Spécifications pour le déploiement volontaire de services de réservation
VII.	• Option V. + Spécifications pour le déploiement obligatoire de services de réservation

Tableau: Résumé des options de déploiement

Analyse et évaluation des impacts, des risques, et de la conformité aux principes énoncés dans la Directive STI (2010/40/UE)

Impacts économiques, sociaux et environnementaux

Les impacts ont été évalués et classés vis-à-vis du scénario de référence. Dans l'ensemble, les options avec intervention représentent toutes une amélioration relative vis-à-vis du statu quo, avec des impacts positifs ou neutres dans les différents champs étudiés. Certains impacts économiques négatifs ont été identifiés dans les options où les spécifications appellent à un déploiement obligatoire, mais ils étaient alors contrebalancés par d'autres impacts économiques positifs, comme par exemple aux niveaux des marchés intérieurs et de la compétitivité du secteur.

Les impacts sociaux et environnementaux sont seulement significatifs dès lors que les spécifications appellent un déploiement obligatoire. Par ailleurs, une fois l'information temps réel effective dans les Zones Prioritaires, le bénéfice additionnel des services de réservation reste discutable.

Impacts sur les parties prenantes

Les impacts sur les parties prenantes ont été évalués et classés vis-à-vis du scénario de référence. Les résultats sont positifs ou neutres pour toutes les parties prenantes, à l'exception des opérateurs d'aires de stationnement. Leur coopération est cruciale pour la collecte des données d'occupation temps réel, mais leurs coûts d'investissement et d'exploitation augmentent.

D'une manière générale, ces impacts sont seulement significatifs dès lors que les spécifications appellent un déploiement obligatoire, en particulier pour ce qui concerne l'information temps réel au niveau des impacts sur les autorités routières et les transporteurs routiers. De même, une fois l'information temps réel effective dans les Zones Prioritaires, le bénéfice additionnel des services de réservation reste discutable.

Impacts sur les marchés et services existants

L'évolution du marché induite par chaque option de déploiement a été décrite de manière qualitative. On observe notamment que les services d'information et de réservation pour le stationnement des poids lourds devraient être des applications mineures dans le contexte général des marchés relatifs à la communication entre véhicules et services centraux, et aux équipements mobiles et embarqués. Pour ces raisons, il faut s'attendre à ce que les services pour le stationnement des poids lourds s'adapteront aux tendances générales de ces marchés, sans les influencer significativement.

Autres aspects
L'analyse a également traité les impacts dits spéciaux, les risques et la conformité aux principes énoncés dans la Directive STI (2010/40/UE). Ces aspects soulèvent des questions spécifiques pour certaines options, et ont amené plusieurs recommandations pour optimiser les spécifications.

En support de l'analyse coûts-avantages, il a été entrepris d'établir une estimation quantitative des coûts et bénéfices pour les options de déploiement. Cette analyse est décrite en détails dans une annexe dédiée de ce rapport. L'estimation est basée sur de nombreuses hypothèses pour pallier le manque ou l'inexistence de données de base. Ce manque s'explique partiellement par la relative nouveauté des expérimentations et projets pilotes, qui fait que peu d'évaluations existent à ce jour. C'est pourquoi, les estimations, synthétisées dans le tableau ci-dessous, doivent être considérées comme des ordres de grandeurs (les nombres ont été arrondis) :

Option de déploiement	Estimation des bénéfices [M€/an]	Estimation des coûts [M€/an]
Scénario de référence	0	0
IV. (information statique obligatoire)	80	4
V. (IV.+ information temps réel obligatoire dans les Zones Prioritaires)	160	25

Tableau: Estimations quantitatives des coûts et bénéfices.

Comparaison des Options et Recommandations

L'option I. est le scénario de référence, le statu quo. Il ne permet pas d'éliminer l'utilisation non optimisée des capacités de stationnement. La situation tend à s'empirer. Toutes les autres options représentent une amélioration vis-à-vis de ce scénario de référence

Les options II. à VII. prévoient le déploiement volontaire ou obligatoire des services d'information et de réservation à travers les spécifications européennes. Les conclusions principales de cette analyse sont :

- Les impacts sont fortement liés au caractère obligatoire du déploiement. Un déploiement volontaire n'engendre que des impacts faibles.
- Les impacts les plus positifs concernent la sécurité routière et les conditions de travail des conducteurs de poids lourds. Ainsi les bénéficiaires principaux sont les autorités publiques et les

conducteurs de poids lourds. Les impacts économiques sont positifs et profitent majoritairement aux transporteurs routiers. On note des impacts environnementaux positifs.

- Les bénéfices sont mineurs voire nuls pour les autres parties prenantes (opérateurs d'aire de stationnement, compagnies d'assurance, chargeurs). La situation la plus critique concerne l'opérateur d'aire de stationnement, car sa coopération est cruciale pour la collecte de données et pour la gestion des réservations.
- La comparaison par paires des options avec et sans réservation (III./VI. and V./VII.) montre qu'une fois l'information temps réel effective dans une Zone Prioritaire, le bénéfice additionnel d'un service de réservation reste discutable, en particulier pour les opérateurs d'aire de stationnement et les transporteurs routiers.
- La situation combinant de l'information statique complète et de l'information temps-réel sur les Zones Prioritaires présente un bon rapport coûts-bénéfices.
- Les données existantes sur les services de réservations ne sont pas suffisantes pour évaluer le rapport coûts-bénéfices.

Les options V. et VII. se révèlent être les meilleures.

L'option V., caractérisée par le déploiement obligatoire de l'information statique et par le déploiement obligatoire mais sélectif d'information dynamique, représente un palier nécessaire vers l'option VII.

L'option VII. inclut le déploiement volontaire de services de réservation en addition du contenu de l'option V. Considérant que les attentes pour des services de réservations sont encore très hétérogènes, que le développement des normes traitant les réservations est encore à un stade peu avancé, et le besoin d'assurer une cohérence entre l'information temps réel et les réservations, il est recommandé de viser l'option V. dans un premier temps.

L'analyse des interdépendances entre les impacts amène les recommandations suivantes :

- Le déploiement de l'information statique doit être étendu à toutes les aires de stationnement pour poids lourds qui desservent le trafic des poids lourds sur le TERN. Le périmètre doit comprendre les infrastructures spécialisées pour poids lourds tout comme les aires multi-services dont le stationnement des poids lourds n'est qu'une des fonctions offertes.

- Le choix des Zones Prioritaires pour le déploiement de l'information temps-réel doit rechercher une synergie avec d'autres mesures de gestion de trafic (STI).
- Les spécifications pour les services de réservation doivent rester suffisamment ouvertes pour servir une large palette de besoins et de situations, comme par exemple des réservations avant ou durant le trajet.

L'analyse des impacts spéciaux fait ressortir plusieurs pistes pour optimiser les spécifications :

- S'assurer que les services de réservations bénéficient à la fois aux conducteurs de poids lourds et à leurs entreprises, en minimisant l'effort lié aux transactions ainsi que les contraintes additionnelles pour les conducteurs (options V. et VII.).
- Inclure des conditions relatives à la fiabilité de l'information temps réel ainsi que des règles pour gérer les cas de dysfonctionnements.
- Inclure des règles pour harmoniser la gestion des annulations et des pénalités en cas de défections (options VI. et VII.).
- Adopter des critères simples pour aider à l'identification des Zones Prioritaires, où doivent obligatoirement être mis en œuvre des services d'information temps réel (options V. et VII.).
- Délimiter les spécifications pour les services de réservations de telle manière à garantir un rapport coûts-bénéfices optimal. De plus amples études pourraient être nécessaires.

Afin de se conformer idéalement aux principes énoncés dans la Directive STI (2010/40/UE), les spécifications peuvent éventuellement être renforcées en :

- S'assurant que les Etats membres limitrophes concernés par des Zones Prioritaires situées sur des corridors de transport transfrontaliers, échangent des informations sur leurs plans de déploiement pour ces services temps-réel, et qu'ils soient encouragés à coopérer pour assurer une continuité de service optimale.
- Laissant suffisamment de flexibilité ou de délai pour permettre aux systèmes existants d'être renouvelés conformément à leur propre cycle de vie.
- S'assurant qu'une unique norme pour traiter les requêtes de réservation soit prescrite, afin de prévenir le risque de développements multiples et divergents.
- Considérant la proximité des terminaux intermodaux importants comme un critère pour l'identification des Zones Prioritaires pour le stationnement.

Par ailleurs l'analyse des risques met en évidence les pistes suivantes pour optimiser les spécifications :

- Pour l'information statique, les spécifications doivent s'assurer que tous les opérateurs d'aire de stationnement sont effectivement poussés à se conformer à leurs obligations (déclaration et qualité des données).
- Pour l'information temps-réel, la configuration des risques est telle que la combinaison de budgets limités et de priorités divergentes entres les acteurs concernés peut entraver le déploiement sur n'importe quelle Zone Prioritaire. Afin qu'une telle situation ne se produise pas, il pourrait être opportun d'inclure dans les spécifications non seulement une claire attribution des obligations de résultats à un type d'acteur (par exemple les Etats membres), mais également une répartition des coûts par défaut.
- Pour les services de réservation, les spécifications doivent garantir que l'information temps-réel et les services de réservation suivent des objectifs cohérents dans les Zones Prioritaires, et que les opérateurs d'aire de stationnement aient la plus grand liberté possible en matière de gestion des réservations sur site (par exemple sur le choix de moyens manuel ou automatique, la mise en œuvre sur des aires dédiées aux poids lourds ou bien sur des aires multi-services…).

Les options de déploiements prévoient la mise à disposition et la réutilisation effectives des données relatives au stationnement des poids lourds pour les prestataires de services. L'information statique doit être gratuite pour les prestataires de services, alors que l'information dynamique peut être sujette à redevance et/ou à des conditions spécifiques de réutilisation. Les spécifications doivent explicitement traitées les conditions garantissant un traitement égalitaire de l'accès aux données entre tous les prestataires de services.

Suivi et Evaluation

Un ensemble d'indicateurs de suivi ex-post sont proposés pour évaluer les effets à long terme des spécifications. Il est notamment proposé :

- D'utiliser tout ou partie de ceux indicateurs, en fonction des aspects jugés les plus importants, et également en fonction des données qui seront disponibles, afin d'assurer une représentativité suffisante pour l'analyse tout en prenant en compte les ressources qui y seront consacrées, souvent limitées.

- D’attribuer la collecte des données de base des indicateurs en fonction des moyens à mettre en œuvre, en partie aux Etats membres, qui pourraient fournir leurs éléments dans le cadre général de leurs rapports relatifs à la Directive STI (2010/40/UE), et en partie à la Commission Européenne.

Z U S A M M E N F A S S U N G

Hintergrund

Die IVS Direktive (2010/40/EU) beinhaltet sechs vorrangige Maßnahmen, für die verbindliche Spezifikationen erarbeitet werden müssen. Zwei dieser Maßnahmen betreffen die Bereitstellung von Informations- und Buchungsdiensten für sichere Parkplätze für Lastkraftwagen und Nutzfahrzeuge.

Die Spezifikationen sind notwendig, um die Einführung von Dienstleistungen sicherzustellen, die eine optimale Nutzung bestehender LKW-Parkplatzkapazitäten ermöglichen. Die Spezifikationen müssen von der Europäischen Kommission bis Ende 2012 für Parkplatz-Informationsdienste und bis Ende 2013 für Parkplatz-Buchungsdienste verabschiedet werden. Sie müssen jeweils auf eine Kosten-Nutzen-Analyse gestützt sein.

Die Europäische Kommission hat ein Arbeitsprogramm in Auftrag gegeben, welches sie bei der Durchführung der Folgenabschätzung sowie beim Entwurf der Spezifikationen unterstützt. Das vorliegende Dokument ist der Abschlussbericht dieses Auftrags und beinhaltet:

- die Ergebnisse der Stakeholder-Befragung, die als Unterstützung für die Folgenabschätzung und den Spezifikationsentwurf durchgeführt wurde,
- die Grundlagen, die für die Folgenabschätzung herangezogen wurden,
- SWOT-Analysen bezüglich der Kodierungsformate und der möglichen Verbreitungskanäle von Informationen und Buchungen
- die Umsetzungsoptionen, die bei der Folgenabschätzung betrachtet wurden
- Analyse und Vergleich der Umsetzungsoptionen
- Die vorgeschlagenen Indikatoren und Mittel für das Monitoring der Umsetzung
- die abschließenden Schlussfolgerungen und Empfehlungen

Stakeholder-Befragung

Die Äusserungen der Stakeholder wurden über drei verschiedene Wege erfasst:

- öffentliche Online-Befragung mit insgesamt 86 Antworten

- 15 Interviews von Akteuren aller Stakeholdergruppen, die größtenteils in persönlichen Gesprächen durchgeführt wurden
- Durchführung eines Stakeholder Workshops mit 63 Teilnehmern

Folgende Stakeholdergruppen wurden berücksichtigt:
- Straßenbehörden, öffentliche und private Straßenbetreiber (oder Verbände)
- Parkplatzeigentümer und –Betreiber (öffentlich/privat)
- Gewerkschaften für LKW-Fahrer
- Transporteur- und Spediteursverbände
- Versicherungsunternehmen
- Polizeikräfte
- Verlader
- Anbieter von Parkinformations- und Reservierungs-Diensten
- Intermediäre in der Bündelung von Daten und Diensten
- Anbieter von Navigations- und Flottenmanagementlösungen
- Tankkartenanbieter
- LKW Hersteller
- Zulieferer für Parkplatzanlagen/-technik

Die Befragung hat gezeigt, dass die Stakeholder die Definition des Problems und seiner Konsequenzen grundsätzlich unterstützen. Folgendes wurde ergänzt:

- Es gibt Gebiete mit hoher und solche mit geringer Nachfrage. Die Lage eines Parkplatzes ist das wichtigste Kriterium für eine hohe Belegung. Kapazitätsengpässe zeigen sich insbesondere in Ballungszentren und werden sich tendenziell verschärfen, da die Nachfrage schneller steigt als die vorhandenen Kapazitäten.

- Beim Transport hochwertiger Güter besteht in gewissen Situationen ein Bedarf an Parkplätzen, die mit besonderen Sicherheitsanlagen und -funktionen ausgestattet sind. Allerdings ist dieses Marktsegment begrenzt.

- Die Wahl des Parkplatzes wird hauptsächlich durch die Fahrer getroffen. Die Fahrer wählen dabei häufig wildes LKW-Parken um ihre Lenk- und Ruhezeiten einzuhalten, wenn sie nicht über die Parkplatzsituation informiert sind.

Einige der Befragten haben von Experimenten mit Wechselverkehrszeichen berichtet, die gute Ergebnisse hinsichtlich der Verteilung der Parkplatznachfrage gezeigt haben, wenn die Information

über mehrere aufeinander folgende LKW-Parkplätze bereitgestellt wurde. Trotzdem erinnern vor allem die Mitgliedstaaten daran, dass die Zuverlässigkeit und das Kosten-Nutzen-Verhältnis für solche Information erwiesen werden muss. Die Straßenbetreiber sprechen sich für eine räumlich begrenzte Umsetzung in spezifischen Zonen oder Korridoren aus, wo das Potenzial für die Optimierung der Parkplatzauslastung hoch ist.

Grundlagen, die bei der Folgenabschätzung berücksichtigt wurden

Unfälle mit Verletzungs- und Todesfolge
Eine durch das CEESAR (Europäischen Zentrums für Studien zu Sicherheit und Risikoanalyse) speziell durchgeführte Analyse kommt zur Schätzung, dass jährlich 44 Todesfälle und 1.430 Verletzte auf wildes LKW-Parken zurückgeführt werden können. Diese Schätzung bildet die potenzielle Einsparung, die bei gänzlichem Verschwinden des wilden LKW-Parkens erreicht würde. Schläfrigkeit des Fahrers und Fahrzeugdefekte sind weitere relevante Unfallfaktoren im Zusammenhang der LKW-Parkierung.

Die wirklichen Einsparungen, die durch Maßnahmen zur Erhöhung der Parkplatzauslastung erreicht werden, werden nur einen Teil der potenziellen Einsparung betragen. Sie muss für jede der Umsetzungsoptionen aufgrund von Annahmen, wie viel LKW-Verkehr von den Informations- und Buchungsdiensten erreicht wird und welche Reduktion des wilden Parkens dadurch erwirkt wird, abgeschätzt werden.

Wirtschaftliche Schäden durch Diebstahl
Die Analyse der verfügbaren Quellen hat gezeigt, dass die Verluste, die innerhalb der EU durch Fracht-Kriminalität verursacht werden, nur teilweise quantifiziert werden können, und dass die Zahlen aus verschiedenen Staaten kein konsistentes Bild ergeben. Obwohl bekannt ist, dass durch Frachtdiebstahl wesentlicher Schaden entsteht, konnte basierend auf den verfügbaren Informationen keine klare und quantifizierbare Verbindung zwischen Kriminalität und LKW-Parkplatzsituation hergestellt werden. Somit bleibt ungewiss, ob und in welchem Ausmaß sich finanzielle Schäden dieser Art durch die Einführung von Parkinformations- und Buchungsdiensten für LKW reduzieren ließen. Die wirtschaftlichen Folgen der Verluste infolge Diebstahl wurden deshalb in der vorliegenden Studie nicht quantifiziert.

Kosten
Um eine Basis für die Kosten-Nutzen-Analyse zu haben, werden beispielhafte Kosten angesetzt. Insbesondere die Kosten für die

Datenerhebung sind mit Unsicherheit behaftet, da die eingesetzten Technologien und ihre Märkte noch nicht gefestigt sind.

Analyse der Stärken, Schwächen, Chancen und Risiken (SWOT-Analyse)

SWOT-Analysen wurden zum Zweck der Definition der Umsetzungsoptionen im Rahmen der Folgenabschätzung sowie für den Entwurf der Spezifikationen durchgeführt.

Kodierungsformate der Daten
Für die SWOT-Analyse von vier Daten-Kodierungsformaten (RDS-TMC, DATEX-II, TPEG und ISO/NP 15638-19) die potenziell zur Kodierung und/oder Beschreibung von Parkplatzinformationen und –Reservierungen verwendet werden können, wurden 21 Kriterien herangezogen.

Es hat sich herausgestellt, dass sowohl DATEX-II als auch TPEG gute Möglichkeiten bieten, um Parkplatzinformationen zu kodieren. Allerdings sind beide Formate ungeeignet für die Beschreibung und Verarbeitung von entsprechenden Reservierungs-/Buchungsanfragen.

Verbreitungskanäle
Für die SWOT-Analyse von elf Verbreitungskanälen (u.a. straßenseitige Wechselverkehrsschilder, Datenfunk, LKW Radiosender, digitales Fernsehen, mobiles Internet und Wechseltextanzeigen) wurden 17 Kriterien herangezogen. Die Analyse bezog sich auf eine Umsetzung auf transeuropäischem Fernstraßennetz (TERN), Autobahnen und zweitrangigem Netz.

Es hat sich gezeigt, dass DAB/TPEG oder DVB-S/TPEG Datenfunk, DVB-SH Datenübertragung und mobiles Internet für die Verbreitung von Parkplatz-Informationsdiensten geeignet sind. Jeder dieser Kanäle hat spezifische Vor- und Nachteile, die in Zukunft von Bedeutung sein könnten (abhängig von Einflussfaktoren, die außerhalb des IVS Bereichs liegen). Daher sollte die Auswahl eines einzelnen spezifischen Verbreitungskanals vermieden werden.

Das mobile Internet ist dabei eine Plattform, die auf eine Vielzahl von Fahrzeuggeräten verfügbar ist und bei der man mittlerweile von einer hohen Verbreitung ausgehen kann. Allerdings müssen die verbundenen Risiken der Ablenkung des Fahrers durch geeignete HMI Anwendungen aufgefangen werden. Straßenseitige Wechselverkehrszeichen und

elektronische Informationsschalter können die Kanäle ergänzen, die in die Fahrerkabine reichen.

Erarbeitung von Umsetzungsoptionen

Ausgehend von der übergeordneten Problemstellung und Zielsetzung wurden neun spezifische Zielsetzungen abgeleitet. Die sieben untersuchten Umsetzungsoptionen (wovon das Szenario I „Nichtstun“ die Ausgangsbasis darstellt) unterscheiden sich hinsichtlich der Art und des Grads der EU-Maßnahmen zur Erreichung der spezifischen Zielsetzungen.

Nr.	Beschreibung
I.	• Ausgangsszenario “Nichtstun” – keine Maßnahmen der EU
II.	• Spezifikationen für die freiwillige Bereitstellung eines statischen Datenbestands • Verbreitung an die Nutzer liegt im Ermessen der Mitgliedsstaaten • Umsetzung von zusätzlichen, echtzeitbasierten ITS-Diensten liegt im Ermessen der Mitgliedsstaaten
III.	• Spezifikationen für die freiwillige Bereitstellung eines statischen Datenbestands und Festlegung von Bestimmungen für die Verbreitung durch Service-Dienstleister • Spezifikationen für eine freiwillige Bereitstellung von zusätzlichen, echtzeitbasierten ITS-Diensten in vorrangigen Zonen, wo die Kapazitäten effizienter genutzt und negative Auswirkungen vermieden werden können
IV.	• Spezifikationen für die verpflichtende Bereitstellung eines statischen Datenbestands • Verbreitung an die Nutzer liegt im Ermessen der Mitgliedsstaaten • Umsetzung von zusätzlichen, echtzeitbasierten ITS-Diensten liegt im Ermessen der Mitgliedsstaaten
V.	• Spezifikationen für die verpflichtende Bereitstellung eines statischen Datenbestands und Festlegung von Bestimmungen für die Verbreitung durch Service-Dienstleister • Spezifikationen für eine verpflichtende Bereitstellung von zusätzlichen, echtzeitbasierten ITS-Diensten in vorrangigen Zonen, wo die Kapazitäten effizienter genutzt und negative Auswirkungen vermieden werden können
VI.	• Option III. + Spezifikationen für die freiwillige Bereitstellung von Parkplatz-Buchungsdiensten
VII.	• Option V. + Spezifikationen für die verpflichtende Bereitstellung von Parkplatz-Buchungsdiensten

Tabelle 1: Zusammenfassung der Umsetzungsoptionen

Analyse und Bewertung der Auswirkungen, Risiken und Übereinstimmung mit den Prinzipien der IVS Direktive

Wirtschaftliche, Soziale und Umweltbezogene Auswirkungen
Die Auswirkungen wurden untersucht und gegenüber der Option „Nichtstun“ (Ausgangsszenario) bewertet. Insgesamt stellen alle Umsetzungsoptionen eine Verbesserung gegenüber dem Ausgangsszenario dar und haben neutrale bis positive Auswirkungen in allen Bereichen. Einige negative Auswirkungen wurden in Optionen

identifiziert, in denen die Spezifikationen zu verpflichtenden Umsetzungen führen. Diese negativen Auswirkungen werden allerdings aufgewogen durch andere volkswirtschaftlich positive Effekte auf z.B. den Binnenmarkt und die Wettbewerbsfähigkeit. Soziale und umweltbezogene Auswirkungen sind nur in Umsetzungsoptionen die zur verpflichtenden Umsetzung führen bedeutend. Der zusätzliche Mehrwert von Parkplatz-Buchungsdiensten, wenn Echtzeit-Parkplatzinformationen in vorrangigen Zonen einmal vorhanden sind, bleibt heute noch fraglich.

Auswirkungen auf Stakeholder
Die Auswirkungen wurden untersucht und gegenüber der Option „Nichtstun“ (Ausgangsszenario) bewertet. Die Bewertungen waren neutral bis positiv für alle Stakeholder-Gruppen, mit Ausnahme der Betreiber von LKW-Parkplätzen. Die Kooperation der Parkplatzbetreiber ist notwendige Voraussetzung für die Erhebung und Zusammenführung von Parkplatzbelegungsdaten, aber bedeutet eine Erhöhung ihrer Betriebskosten und zusätzliche Investitionen. Insgesamt gab es hier nur in den Umsetzungsszenarien bedeutende Auswirkungen, in denen eine verpflichtende Einführung angenommen wurde. Vor allem das Vorhandensein von Echtzeitinformationen hätte deutliche Auswirkungen für die Straßenbehörden und Transporteure. Auch hier hat sich gezeigt, dass der zusätzliche Mehrwert von Parkplatz-Buchungsdiensten fraglich ist, wenn Echtzeitinformationssysteme in vorrangigen Zonen schon eingeführt sind.

Auswirkungen auf existierende Märkte und Dienstleistungen
Die erwartete Marktentwicklung wurde für jede der Umsetzungsoptionen qualitativ beschrieben. Es wird dabei offensichtlich, dass Parkplatz-Informations- und Buchungsdienste für LKW nur eine Anwendung von minderer Bedeutung sind, wenn man die Märkte für Kommunikationsdienstleistungen zwischen Fahrzeugen und zentralen Infrastrukturen sowie für portable und ins Fahrzeug integrierte Systeme als Basis heranzieht. Daher muss davon ausgegangen werden, dass sich diese Dienste an die großen Trends dieser Märkte anpassen werden, ohne sie wesentlich zu beeinflussen.

Weitere Aspekte
Die Analyse hat spezifische Auswirkungen, Risiken und die Übereinstimmung mit den Prinzipien der IVS Direktive betrachtet. Aus dieser Analyse lassen sich spezifische Probleme für einige der Umsetzungsoptionen ableiten, sowie Empfehlungen für die Optimierung der Spezifikationen.

Also Grundlage für die Kosten-Nutzen-Analyse wurde eine quantitative Schätzung von Kosten und Nutzen der Umsetzungsoptionen erarbeitet. Die detaillierte Beschreibung befindet sich im Anhang. Die Schätzung ist auf zahlreiche Annahmen gebaut, wo die Datengrundlagen fehlen oder mangelhaft sind. Dieser Mangel ist unter anderem darauf zurückzuführen, dass Versuche und Pilotprojekte erst kürzlich gestartet wurden und noch wenige Auswertungen vorliegen. Daher müssen die Schätzungen in der folgenden Tabelle insgesamt nur in ihrer Größenordnung gewertet werden (Zahlen sind gerundet):

Umsetzungsoption	Nutzenabschätzung [Mio. € p.a.]	Kostenabschätzung [Mio. € p.a.]
Ausgangsszenario	0	0
IV. (statische Informationen verpflichtend)	80	4
V. (IV.+ Echtzeitinformationen in vorrangigen Zonen verpflichtend)	160	25

Tabelle 2: Kosten-Nutzen-Bewertung

Vergleich der Optionen und Empfehlungen

Option I ist das „Nichtstun-Szenario“. Es löst das Problem der ineffizienten Nutzung der LKW-Parkplätze nicht. Der Trend ist, dass sich die Situation weiter verschlechtert. Im Vergleich zu dieser Option haben alle weiteren Optionen positive Effekte.

Die Optionen II bis VII sehen die freiwillige oder verpflichtende Umsetzung von Informations- und Buchungsdiensten durch europäische Spezifikationen vor. Die Haupt-Empfehlungen dieser Analyse sind:

- Effekte ergeben sich hauptsächlich bei verpflichtender Umsetzung. Bei freiwilliger Umsetzung werden nur geringe Auswirkungen erreicht.
- Die größten positiven Effekte ergeben sich im Bereich der Verkehrssicherheit und hinsichtlich der Arbeitsbedingungen der LKW-Fahrer. Die öffentlichen Verwaltungen und die Fahrer sind daher die Haupt-Begünstigten. Es ergeben sich ebenfalls positive wirtschaftliche Effekte hauptsächlich für die Spediteure. Des Weiteren entstehen positive Auswirkungen für den Umweltbereich.
- Es ergeben sich keine oder kaum positive Auswirkungen auf weitere Interessengruppen (LKW-Parkplatzbetreiber, Verlader, Versicherungsunternehmen). Der kritische Punkt ist der Einbezug der

Parkplatzbetreiber, da sie die Datenerhebung realisieren und Parkplatzbuchungen bewirtschaften müssen.

- Der paarweise Vergleich der Optionen mit bzw. ohne Buchungsoption (III./VI. und V./VII.) zeigt, dass zusätzliche Vorteile durch ein Buchungssystem fragwürdig sind, wenn einmal ein Echt-Zeit Informationssystem besteht. Das gilt insbesondere für Parkplatzbetreiber und Spediteure.
- Statische und dynamische Informationen in vorrangigen Zonen sind kostengünstig. In Bezug auf Buchungsdienste fehlen die Grundlagen für den Nachweis der Wirtschaftlichkeit.

Die Optionen V und VII gehen als bevorzugte Szenarien aus der Analyse hervor.

Option V, welche die obligatorische Bereitstellung von umfangreichen statischen sowie ausgewählten dynamischen Informationen beinhaltet, kann als notwendiger Zwischenschritt in Richtung der Option VII gesehen werden..

Option VII beinhaltet zusätzlich zu Option V den verpflichtenden Einsatz von Buchungssystemen. Insgesamt wird die Umsetzung von Option V als ersten Schritt empfohlen, da hinsichtlich der Option VII folgende Einschränkungen bestehen:

- Die Erwartungen hinsichtlich eines Buchungssystems sind uneinheitlich
- Die Entwicklung von Standards für Buchungssysteme befindet sich erst in einem frühen Stadium
- Es besteht die Notwendigkeit, die Konsistenz zwischen dynamischen Informationen und den Buchungsprozessen zu gewährleisten.

Die folgenden Empfehlungen ergeben sich basierend auf der Analyse der Wechselwirkungen zwischen den bewerteten Auswirkungen:

- Die Bereitstellung von statischen Informationen sollte für alle LKW-Parkplätze entlang des trans-europäischen Straßennetzes (TERN) vollzogen werden. Die Informationen sollten sowohl dedizierte LKW-Parkplätze als auch Mehrzweck-Areale, die LKW-Parken als eine Leistung unter vielen anbieten, umfassen.
- Bei der Auswahl von vorrangigen Zonen, in denen dynamische Informationsdienste eingesetzt werden, sollte auf Synergien mit anderen intelligenten Verkehrsdiensten geachtet werden.
- Bei der Spezifikation der Buchungssysteme sollte Raum für verschiedene Bedürfnisse und Situationen gelassen werden, z.B. Buchungen während der Fahrt als auch Buchungen vor Fahrtbeginn.

Basierend auf der Analyse der spezifischen Auswirkungen können folgende Hinweise zur Verbesserung der Spezifikationen gegeben werden:

- Es muss sichergestellt werden, dass Buchungssysteme sowohl die LKW-Fahrer als auch die Transportunternehmen unterstützen. Dies bedingt, dass der Aufwand für den Buchungsprozess und die damit verbundenen Einschränkungen für den Fahrer minimiert werden (Optionen V und VII)
- Die Spezifikatinoen sollten Anforderungen bzgl. der Verlässlichkeit dynamischer Informationen und Regeln für den Umgang bei Störungen beinhalten
- Sie sollten einheitliche Regeln für Stornierungen und Gebühren für Nichterscheinen beinhalten (Optionen V und VII)
- Die Kriterien für die Festlegung der vorrangigen Zonen, in denen die Einführung von Echtzeit-Informationssysteme verpflichtend ist, sollten einfach sein (Optionen V und VII)
- Der Einsatzbereich von Buchungsdiensten sollte im Hinblick auf ein optimales Kosten-Nutzen-Verhältnis bestimmt werden. Hier könnten weitere Untersuchungen notwendig sein.

Für eine optimale Einhaltung der Grundsätze der IVS Richtlinie könnten die Spezifikationen folgendermaßen angepasst werden:

- Wo die vorrangigen Zonen für die ITS-basierten Parkplatzsysteme entlang grenzüberschreitender Transportkorridore liegen, sollte sichergestellt werden, dass sich die benachbarten Mitgliedsstaatengegenseitig Informationen bzgl. ihrer Planungen zu dynamischen Informationsdiensten austauschen und dass sie zur Kooperation ermutigt werden, um einen nahtlosen Service herzustellen.
- Es sollte hinreichend Zeit und Flexibilität gewährt werden, dass bestehende Systeme im Rahmen ihres normalen Lebenszyklus erneuert und angepasst werden können.
- Es sollte ein einheitlicher Standard für den Umgang mit Buchungsanfragen vorgeschrieben werden, um das Risiko von divergierenden Entwicklungen zu verhindern.
- Die Nähe von wichtigen Umschlagterminals für den intermodalen Verkehr sollte als Kriterium bei der Festlegung von vorrangigen Zonen für die Anwendung von ITS basierten Parkplatzsystemen berücksichtigt werden.

Aus der Risikobewertung ergeben sich die folgenden Hinweise zur Optimierung der Spezifikationen:

- In Bezug auf statische Informationen sollten die Spezifikationen sicherstellen, dass alle LKW-Parkplatzbetreiber effektiv zur Einhaltung der Datendeklarationsverpflichtung und der Qualitätsanforderungen gebracht werden.
- In Bezug auf dynamische Informationen kann die Risikokonstellation (knappe Mittel und verschiedene Prioritäten der Akteure) dazu führen, dass die Umsetzung in vorrangigen Zonen ins Stocken kommt. Um diese Situation zu vermeiden, könnte es sinnvoll sein, dass in den Spezifikationen nicht nur die Pflichten eines jeden Aktors (z.B. Mitgliedsstaat) beschrieben werden, sondern auch eine Standard-Aufteilung der Kosten.
- In Bezug auf Buchungsdienste sollten die Spezifikationen sicherstellen, dass Echtzeit-Informationen und Buchungsprozesse die gleichen Ziele in vorrangigen Zonen verfolgen und dass die LKW-Parkplatzbetreiber die größtmögliche Freiheit haben, um Buchungen vor Ort bearbeiten zu können (z.B. Nutzung manueller oder automatischer Prozesse, Einführung auf speziellen LKW-Parkplätzen und auch auf Mehrzweck-Parkplätzen, …)

Die Umsetzungsoptionen sehen einen effektiven Zugang und die Wiederverwertbarkeit der Informationen der LKW-Parkplatzbetreiber durch andere Dienstleister vor. Statische Informationen sollten dabei kostenfrei zur Verfügung gestellt werden. Dynamische Daten könnten hingegen mit einer Gebühr oder besonderen Nutzungsbedingungen belegt werden. Die Art und Weise, wie dritten Dienstleistern gleichberechtigt der Zugang zu den Informationen gewährleistet werden muss, sollte bei der Ausarbeitung der Spezifikationen genau behandelt werden.

Monitoring und Evaluierung

Um die Langzeiteffekte der Spezifikationen bewerten zu können, werden eine Reihe von nachgelagerten Monitoring-Indikatoren beschrieben. In diesem Zusammenhang wird folgendes empfohlen:

- Es können alle oder nur eine Auswahl der Kriterien verwendet werden. Das sollte davon abhängig gemacht werden, welche Aspekte als besonders wichtig eingestuft werden und welche Informationen verfügbar sind. Vor dem Hintergrund begrenzter Ressourcen für die Begleitung der Umsetzung soll damit trotz allem eine hinreichende Repräsentativität der Bewertung gewährleistet werden.
- Die Verantwortung für die Erhebung der Indikatoren sollte je nach der entsprechenden Methode der EU Kommission oder den

Mitgliedsstaaten zugeordnet werden. Letztere sollten die Ergebnisse in die reguläre Berichterstattung zur IVS Direktive einfließen lassen.

1 Introduction

1.1 Context and rationale of the study

"Directive 2010/40/EU (ITS Directive) of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport includes six priority actions for which binding specifications will be elaborated (Article 6). One of these actions is on:

- Provision of information and reservation services for safe and secure parking places for trucks and commercial vehicles (Art. 3, item e and f).

The ITS Directive foresees EU-wide specifications for information and reservation on safe and secure truck parking to be adopted by the European Commission. These binding specifications should ensure information for safe and secure parking places for trucks and commercial vehicles services based on existing standards and technology. In the medium term they will contribute to optimise parking information.

According to Annex 1 of the ITS Directive the specifications (and standards) shall include the following:

The definition of **the necessary measures to provide ITS based information and reservation services** for safe and secure parking places for trucks and commercial vehicles in particular in service and rest areas on roads based on:

- the availability of the road parking information to users

- the facilitation of the electronic data exchange between road parking sites, centres and vehicles

- the integration of relevant ITS technologies in both vehicles and road parking facilities to update the information on available parking space for reservation purposes

Specifications are to be adopted by the European Commission as a delegated act (Article 290 TFEU) until the end of 2012. In the process of elaborating the specifications, and prior to their adoption, an Impact

Assessment including a cost benefit analysis needs to be conducted as per Article 6.7 of the ITS Directive."[1]

1.2 Objectives of the study

"The study will support the Commission in carrying out the impact assessment of the priority action e) and f) of the ITS Directive on the provision of information and reservation services for truck and commercial vehicles. More precisely the study aims at:

- Providing quantitative and qualitative research and analysis to support and demonstrate the problem definition established by the Commission
- Measuring the potential economic, social and environmental consequences of the various policy options described in the Task Specification
- Consulting the various stakeholders on the envisaged options
- Proposing operational objectives supporting the implementation of the policy options and their long-term evaluation.

In doing so, the study shall enable the Commission to prepare the definition, scope and content of the specifications for the provision of information and reservation services for safe and secure parking, in compliance with the obligations of the ITS Directive."[2]

[1] European Commission, Task Specification, Feb. 2012
[2] Idem

1.3 Work Breakdown Structure

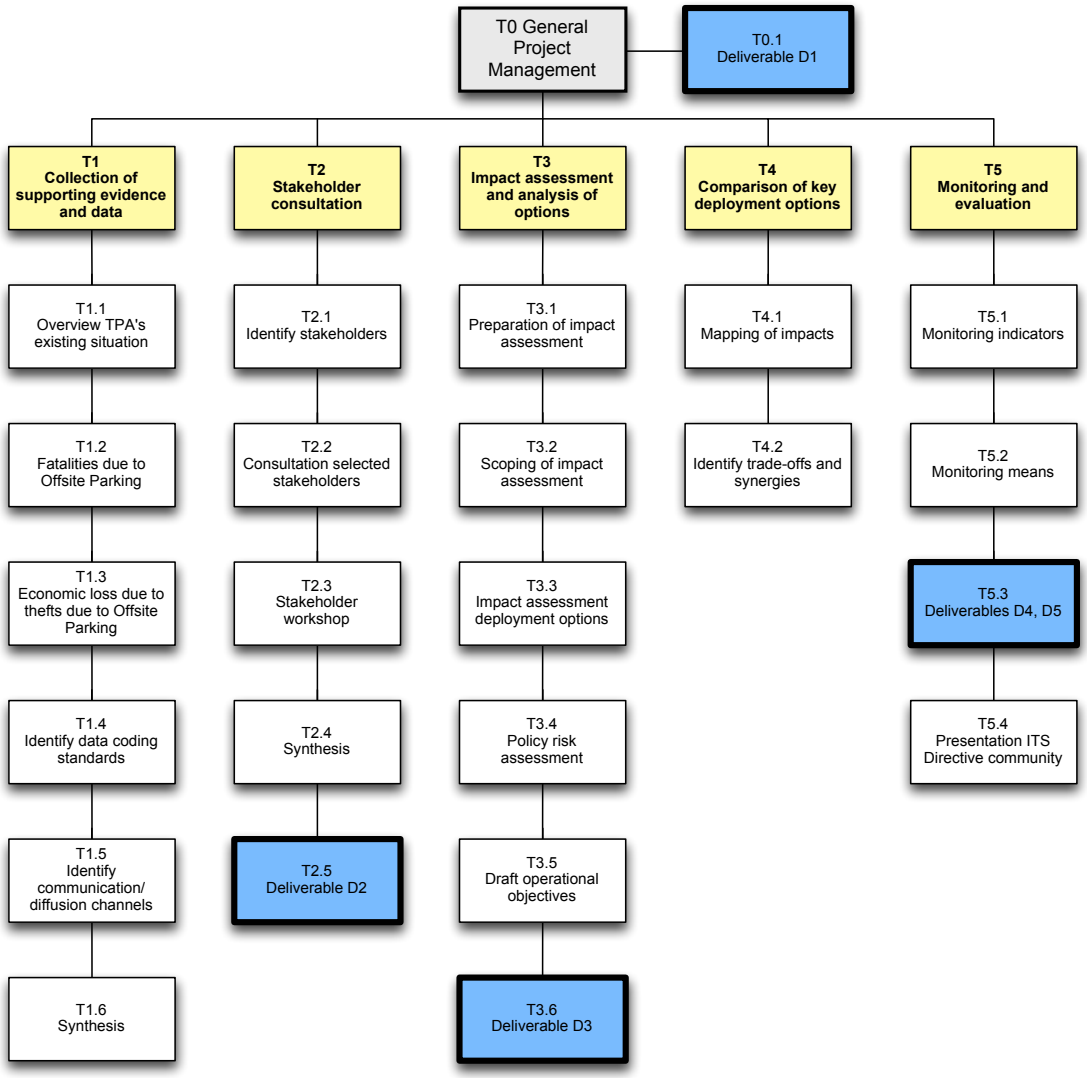

Figure 1: Work Breakdown Structure

1.4 Scope of the present report

This document constitutes Deliverable D4 of the study: Draft Final Report.

It summarises the results of tasks T1, T2 and T3:
- Collection of supporting evidence and data
- Stakeholder consultation
- Impact Assessment and analysis of options.

These results have been presented in the earlier deliverables D2: *Stakeholder Consultation Report*, and D3: *Intermediate Report*.

It presents the results of tasks T4 and T5 as consolidated to date:
- Comparison of key deployment options
- Monitoring and evaluation.

It contains a Management Section on the achievements of the study objectives, differences between work expected and actually carried out, use of resources, etc. The Management Section will not be part of the definitive version of the Final Report (deliverable D5).

1.5 Terminology

The following terminology is used:

• Onsite parking: use of any relevant safe and secure parking place to park a truck on Corridors and Highways only.

• Offsite parking: is considered when Trucks or commercial vehicles park outside safe and secure parking areas on highways or corridors, leading to potential road safety risks and to security problems (potential thefts and attacks). Parking inside overcrowded parking areas is also considered as offsite parking.

• Truck parking areas (TPA): any parking areas for trucks and commercial vehicles.

• Safe and Secure Truck Parking Area (s+sTPA): truck parking area for trucks and commercial vehicles taking account of the LABEL security and comfort classification from level 1 to level 5, providing minimum reasonable requirement for physical security to high security standards.

- To remind, security level 1 includes some basic security features:
  - The site is recognizable as a parking area.
  - Driving and pedestrian areas are well lit.
  - Elementary security checks take place (e.g. police visits patrols)

  All higher levels include at least CCTV monitoring or a continuous fence.

- In terms of comfort and dignity level 1 of service should include basic service features:
  - Toilets, water taps, waste bins.
  - Walking and driving across the area should be safe.

• Vehicles concerned: HGV Heavy good vehicles and commercial vehicles.

• Road networks concerned: Motorways, corridors (TEN-T Core network corridors), Trans-European Road Network.

• Information services: any service that provides information to the truck drivers, dispatchers, traffic management agents and other agents within the concerned organisations (hauliers, cargo owners, insurance companies, road authorities, police forces, …) regarding TPA:

- Static information service: any service that provides static information regarding TPA, such as location, LABEL categories, features on-site…

- Dynamic information service: any service that provides dynamic information regarding TPA, such as number of available parking spaces, occupancy status (free/full), closed/open…

• Reservation services: any service that allows truck drivers or dispatchers to book a truck parking space in advance

• Priority Zone for ITS Parking of Trucks and Commercial Vehicles: is defined as such a perimeter of one or several sections that fulfils one or several of the following criteria:

- There is a shortage of spaces on one or several safe and secure parking areas for trucks and commercial vehicles, which can be alleviated, at least in some situations, by better use of unused parking capacity located within the same perimeter
- There are trucks parked offsite within the perimeter
- There are reports on high accidents risks and/or frequent cargo theft and attacks on drivers, and/or bad working conditions for drivers
- There is a recurrent need of strong HGV traffic management due to bottlenecks (e.g. snow, mountain crossings, tunnels, …)

The number of trucks present in this perimeter and the proximity of a major urban area or freight delivery area should be considered also.

The objective is for each Member State to analyse and determine where those zones are located. Pilots should then provide on-trip guidance based on real time information services to obtain higher efficiency of parking occupation in these crowded zones.

Note: The term "ITS Parking Hot Spot" has been used with the same meaning during the study.

• EFC: Electronic fee collection

2 Findings from the Stakeholder Consultation

2.1 Methodology

Feedback from stakeholders has been gained by three methods:

1. Public on-line consultation
2. Stakeholder interviews
3. A stakeholder workshop

This large consultation has aimed to ensure a close cooperation with stakeholders and Member States and to obtain advice on the commercial and technical aspects of the deployment of information and reservation services within Europe.

2.1.1 Public On-line Consultation

The public consultation was implemented by way of a web-questionnaire posted on the "Your Voice in Europe" tool of the European Commission. The questionnaire was on-line from 15th March to 08th June 2012 on the Commission website. The link to the consultation was distributed by DG MOVE through existing mailing lists that comprise identified stakeholder organisations. The recipients were invited to distribute the link further.

The number of responses was 86. Responses were received from 20 member states and two non-member states. While there is a good balance between private organisations and professional organisations, public authorities and citizens were underrepresented.

The questionnaire and the detailed analysis of all responses are given in Deliverable D2.

2.1.2 Interviews

The direct consultation of stakeholders aimed to gather additional evidence/data for the impact assessment, to obtain best practices and lessons learnt from field experiences, and to understand the role these stakeholders have played and their relation with each other, and finally to gather views and positions on the subject.

The range of stakeholders includes:

- Public (association of) road authorities, public/private (association of) road operators
- Parking area providers, parking area operators (public/private)

- Unions of truck drivers,
- Associations of hauliers,
- Insurance companies,
- Police forces
- Cargo owners,
- Information service providers, reservation service providers,
- Content and service aggregators
- Navigation and fleet management solution providers
- Petrol Card providers,
- Truck manufacturers
- Parking equipment suppliers.

Interviews were conducted mainly face-to-face, with some completed by phone or through e-mail exchange.

The list of interview partners, the interview guidelines and the detailed analysis of the interviews can be found in Deliverable D2.

2.1.3 STAKEHOLDER WORKSHOP

The stakeholder workshop has taken place in Brussels on the 28th of June 2012 with 63 participants.

A summary of the main issues raised and comments made, as well as the agenda, the attendance list and the presentations of the workshop can be found in Deliverable D2.

2.2 Synthesis of Stakeholder Feedback

The problem addressed by the study is that truck drivers do not have access to information regarding safe and secure truck parking areas, nor the availability of parking spaces, nor possibilities to secure a place in advance. This leads to an inefficient use of existing safe and secure parking spaces for trucks on the core European road network and to increased offsite parking.

The stakeholders strongly support the problem definition and its consequences and added that:

- There are high-demand and low-demand areas. Location is the primary factor for high parking occupancy. The capacity strain can be felt in

conurbations in particular. It will grow in tendency, since demand grows faster than capacity.

• The limited market segment of high value cargo transportation does sometimes require parking areas with high security equipment.

• The decision where to park is mainly taken by the drivers, who if not informed on parking possibilities, would prefer to respect working regulations and may then park off-site.

In order to deploy the provision of information and reservations services for safe and secure parking spaces for trucks and commercial vehicles, the stakeholder consultation identifies the subsequent necessary measures:

I. MAKE AVAILABLE **STATIC** INFORMATION TO ALLOW A WISE DECISION OF WHERE AND WHEN TO PARK, ACCORDING TO VARIOUS NEEDS.

Public and private parties agree that provision of static parking information will contribute to optimise the use of parking supply by supporting the planning process (pre-trip purposes) and by allowing the drivers to make a wide decision while driving (on-trip purposes).

Information provided should detail the location and the services offered by each s+sTPA, and should be available everywhere, via different means of communications and in the language of the user.

No harmonised extensive provision of static information exists today. The collection of static data directly by information service providers turned out to be very difficult, and maintenance of this information even more challenging.

There is a consensus to state that static information is the basis for any further information and reservation service, and should therefore be prioritised. Hence static information needs to be collected extensively. In order to ensure what has failed till now, organisational specifications for the collection of static information are needed. This should also ensure the control of the quality of information. The possible organisation of responsibilities outlined at the stakeholder workshop has been welcomed (see Annex L).

II. MAKE AVAILABLE **DYNAMIC** INFORMATION TO ALLOW A WISE DECISION OF WHERE AND WHEN TO PARK, ACCORDING TO VARIOUS NEEDS.

Stakeholders agree that the provision of dynamic information may allow the drivers to make a wise decision of where and when to park, according to their needs.

Representatives of drivers and hauliers largely imagine that provision of dynamic information will positively influence the efficient usage of parking areas. On-trip provision will be helpful for unplanned parking situations or when unforeseen events (e.g. congestion) require changing a forecasted stop.

The very first experiments with VMS in France and Germany have shown good results in terms of parking usage distribution when information is provided for several successive s+sTPA.[3]

Yet Member States (FR, NL) remain skeptical and remind that the reliability and cost/benefits efficiency of this information should be proven.

According to Road operators, the provision of dynamic information should primarily be deployed on limited spatial scales in a specific corridor or zone, where there is a strong potential for optimising occupancy.

III. FACILITATE THE ELECTRONIC DATA EXCHANGE BETWEEN S+STPA OPERATORS, THIRD PARTIES AND VEHICLES.

The existing model based on the motivation of the s+sTPA operator for providing and updating static information does not work efficiently.

All stakeholders agree that harmonisation of data format and interfaces will facilitate the exchange of information.

Public s+sTPA operators all agree to provide static information as widely as possible and to any other interested parties, once it will be available.

[3] In France on the A10 motorway, field experiments with dynamic information showed it was possible to optimise the parking demand on several s+sTPA on a specific corridor. Overcrowded area occupancy decreased by 5%, while under-occupied s+sTPA occupancy increased by 26%.
In another example, the German Ministry experimented with the provision of dynamic information on occupancy (number of parking spaces remaining) of several s+sTPA disseminated through VMS along the motorway. The information provided was welcomed, considered to be satisfactory and was well understood by the drivers. For example 65% of drivers polled agree that they could change their choice of parking if they saw in advance that the s+sTPA they chose was full.

Private s+sTPA operators have no obligation to publish data on their facilities, though authorities think it is in their interest to do so.

When dynamic information is available, all s+sTPA operators consulted agree to share information as widely as possible but not necessarily for free. They would prefer a single entry point or a single intermediary where they could provide such information, and not necessarily free of charge.

Today, there are no agreements for sharing data between existing information service providers (with s+sTPA-specific data) and any other third party, for data property issues or for commercial reasons. This has hampered the provision of truck parking related information into the vehicle.

According to information and reservation service providers, no profitable business model for s+sTPA information services exists today.

However the sharing of information will allow the coverage of a large supply of s+sTPA and sufficient audience through already installed on-board ITS devices, permitting then to create a profitable business model.

IV. INTEGRATE THE RELEVANT ITS TECHNOLOGIES IN BOTH VEHICLES AND ROAD PARKING FACILITIES TO UPDATE THE INFORMATION ON AVAILABLE PARKING SPACE FOR RESERVATION PURPOSES.

According to the s+sTPA Operators, reservation services require the integration of access control barriers at the facilities in order to secure the reserved parking space.

However, very few s+sTPA are equipped with such equipment and no stable funding model has been found for it in the past decade. To this end, an organisational model that corresponds to the micro-economic cost-benefit relation of all involved parties is needed.

Payment is not deemed to be a current issue. Of course many solutions are available but ITS payment methods (e.g. EFC OBU, fuel card) would have the advantages of not requiring the drivers to pay themselves, to provide an indubitable proof of parking for the transport buyer, and to be readily accessible to most truck drivers.

Regarding the integration of ITS technologies inside the vehicle, only large transportation companies can afford to invest in specific ITS devices

(navigation and fleet management devices) for their vehicles. Yet significant opportunities exist with other ITS devices since many trucks have EFC OBU, and many are equipped with a digital tachograph by now.[4]

Information and reservation services have already been implemented on one on-board ITS device (fleet management device) but has not been deployed on the market due to insufficient s+sTPA coverage.
Integration on further ITS devices (navigation devices, digital tachograph, …) is possible and has been investigated by the private parties.

However for safety reasons, driver involvement should be as low as possible while driving. The private parties involved think that an appropriate HMI is feasible.

According to the ITS solutions providers, fostering and easing this integration inside the truck will require the definition of standard interfaces between the system of s+sTPA operators, information and reservation services providers and the in-vehicle devices.

[4] The impact assessment that accompanies the proposed revision of the tachograph system estimates that by 2020, 80% of the vehicles covered by the Tachograph Regulation will be equipped with a digital tachograph. The estimation is based on fleet renewal. [Commission Staff Working Paper, Impact Assessment on measures enhancing the effectiveness and efficiency of the tachograph system, 2011]

3 Data Coding Standards and Distribution Channels

SWOT analyses have been elaborated in order to help define the deployment options for the impact assessment, and in the development of the specifications.

3.1 SWOT Analysis of Data Coding Standards

3.1.1 Scope

The analysis addressed four data coding standards:

- RDS-TMC
- DATEX-II
- TPEG
- ISO/NP 15638-19 (TARV specifications).

These standards were selected for their potential to be used to code truck parking information and/or describe and process truck parking reservations.

21 criteria were assessed for each of the four standards, and subsequently summarised in strengths, weaknesses, opportunities and threats.

The resulting SWOT tables can be found in Appendix B. The full analyses, preceded by the list of criteria and a short description of each standard, can be found in Deliverable D3.

3.1.2 Results

The analysis shows that RDS-TMC allows for the coding of only the most basic information on truck parking areas (name, location). Extension of the coding protocols to meet the needs of Priority Actions E and F of the ITS Directive, would be difficult and complicated as it would require the updating of the software of a large installed base of end-user devices. Further, TMC and its underlying standards are in the 'maintenance' phase, i.e. closed to new functionality. RDS-TMC is therefore considered unsuited for the purpose at hand.

Both DATEX-II Part 6 and TPEG-PKI allow for detailed coding of both static and dynamic information on parking areas, including information of specific interest to truck drivers and logistics planners. A specific strength of DATEX-II is that it is widely deployed for communication between road authorities, traffic information and management centres, and traffic information service providers. However:

- Considering that for only a very limited number of TPA information is actually collected, the added value of DATEX-II as being widely used by road authorities is limited.
- Information services are of particular interest for the secure truck parking areas, which in most cases are operated by private organisations.

DATEX-II in general is not used for delivering information to the end-user as it does not in itself provide for compact coding of information. TPEG was designed for both the exchange of detailed information between the various organisations in the value chain, as well as efficient delivery of content to the end-user. It allows for a basic description of reservation options for a TPA.

Both DATEX-II and TPEG provide a good solution for the coding of TPA information. TPEG however seems the obvious choice for harmonising information services on TPA, because it is suited for data coding in the full value chain, from data collection to delivery to the end-user.

Neither DATEX-II part 6, nor TPEG-PKI allow for the definition and processing of reservation requests. Part 19 of the TARV-specifications seems to provide a good first step for processing reservation requests. It will however take some time before these specifications can be considered technologically mature.

3.2 SWOT Analysis of Distribution Channels

3.2.1 SCOPE

The analysis addressed 11 distribution channels:

- Road-side VMS
- SMS/MMS services
- Voice response systems
- RDS/TMC data casting
- Truck radio station
- DAB/TPEG data casting
- DVB-H TV channel
- DVB-S/TPEG data casting
- DVB-SH data communication
- Mobile internet
- Electronic information booths.

In contrast to the data coding standards that are needed over the whole value chain of information and reservation services, the distribution channels were selected for their potential use in the information distribution process to the end user.

17 criteria were assessed for each of the 11 channels, and subsequently summarised in strengths, weaknesses, opportunities and threats.

The resulting SWOT tables can be found in Appendix C. The full analyses, preceded by the list of criteria and a short description of each channel, can be found in Deliverable D3.

3.2.2 RESULTS

Each of the examined channels has specific benefits and drawbacks. For the TPA information services, a channel is required that provides sufficient bandwidth and flexibility to allow for a detailed description of TPA services and status. This means SMS/MMS services, Voice response systems, RDS/TMC data casting, Truck radio station, and DVB-H TV channels are not suited for this purpose.

DAB/TPEG or DVB-S/TPEG data casting, DVB-SH data communication and Mobile internet would all be suited for this purpose as they can all carry detailed information coded in for example TPEG-PKI to the truck driver's cabin. Each of these channels has specific advantages and disadvantages that might be emphasised over the coming years, depending on factors that are external to ITS. Selecting one specific channel as preferred distribution channel should therefore be avoided, when it comes to a long-term perspective.

At present, Mobile Internet distinguishes itself through the large installed base. Mobile Internet can serve all types of in-vehicle devices, and it is not intrinsically linked to smartphones (and poorly designed apps). The risk of driver distraction must be addressed through the development of appropriate HMI applications.

Road side VMS and electronic information booths could be used to supplement the information dissemination to truck drivers through DAB, DVB and mobile internet.

It is concluded therefore that there should be no prescription of a specific distribution channel for information and reservation services for safe and secure truck parking.

4 Supporting Data and Evidence for the Impact Assessment

4.1 Fatalities due to Offsite Parking

4.1.1 APPROACH

As part of the present study, a detailed investigation of road accidents involving parked trucks has been performed. The goal was to examine how the safe and secure TPA could be a relevant answer to a number of causes of these accidents. The investigation considered not only fatalities but also injuries.

The analysis has been undertaken by CEESAR, a specialised laboratory (European centre of studies on safety and risk analysis). Ceesar is an independent French non-profit organisation, which is accredited for accessing relevant databases, including CARE, BAC, Renault Trucks, and ETAC.

The investigation was made with the ETAC database (European Truck Accident Causation). ETAC is a unique European database that includes only HGV accidents and around 3 000 possible parameters per accident. It makes this database very complete and accurate. The database results from a project initiated and funded by the European Commission and the IRU (International Road Transport Union). CEESAR was the coordinator of 7 institutes from 6 European countries.

The ETAC database consists of 624 road accidents involving at least one HGV (it means 722 trucks with 433 trailers involved). The accidents happened between May 2004 and March 2006. All accidents involve at least one injured person. Of these 624 road accidents, only 12 involve a parked HGV. The following results are focused on these 12 accidents (2% of all ETAC accidents).

Further databases were considered but dropped for the present purpose:

- BAAC (Bulletin d'Analyse des Accidents Corporels de la circulation) is a French database. Source data - i.e. police report - is collected in order to determine judicial responsibilities, rather than to clarify the events and circumstances that led to the accident. BAAC is the national road accident database. Data included in this French database is derived from the police reports. The national database produces general statistical information on road safety.

- CARE (Community Road Accident Database) is a Community database on road accidents resulting in death or injury (no statistics on accidents with damage only). The major difference between CARE and most other existing international databases is the high level of disaggregation, i.e. CARE comprises detailed data on individual accidents as collected by the Member States. This structure allows for maximum flexibility and potential with regard to analyzing the information contained in the system and opens up a whole set of new possibilities in the field of accident analysis.

- RENAULT TRUCKS is a database on road accidents involving at least one HGV. The owner of this database is RENAULT TRUCKS, and CEESAR has fed data into it for 20 years.

The CARE and BAAC databases have not been chosen, because these databases contain a limited set of characteristics about accidents. Only descriptive information is given. Nothing is said about the place of the vehicle before the accident (and especially the fact that a vehicle is parked). There is no analytic data about accident causes.

The Renault Trucks database could be used for the present purpose, but its access and use could not be secured in the framework of the present study.

4.1.2 Detailed Investigation of Accidents Involving Parked Trucks

For each of the twelve road accidents studied, an analysis sheet has been created. The analysis sheet includes:

- Accident circumstances (location, date, time, …),
- Type of vehicle involved (brand, model, color, headlight used, …),
- Road infrastructure description (road type, width, …),
- Driver description (injury, tiredness, blood alcohol level, …),
- Accident analysis (pre-collision, precipitating event, evasive actions, accident causes and collision)
- A conclusion on the assessment of a safe parking place: Would the accident have been avoided if the truck had been parked on a safe parking place instead of where it was effectively parked?

A summary of each road accident involving a parked truck is given in Appendix D. The detailed accident sheets can be found in Deliverable D2.

4.1.2.1 ACCIDENT CONDITIONS

The numbers must be taken cautiously because only 12 cases have been studied.

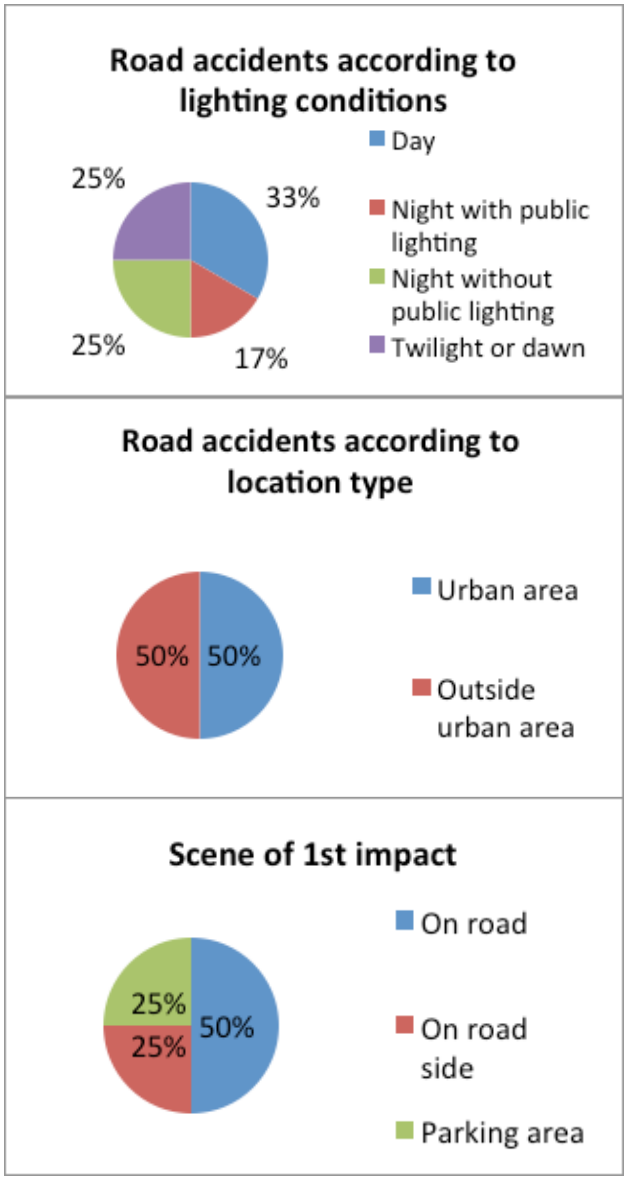

Figure 2:Accident conditions of accidents involving a parked truck [sample of 12, ETAC database]

A limitation of this study resides in the fact that it is unknown, in some cases, if the HGV was parked for a long period of time (resting time) or if

the driver was stopped for a couple of minutes to look for his way, for example.

4.1.2.2 ASSESSMENT OF SAFE TRUCK PARKING PLACE

For each road accident, we look at the circumstances to judge if a safe truck parking place could have been useful. We take into account the location of the truck parking (dangerous location, forbidden location …), and if the manner the truck is parked can hamper the other road users and lead to an accident. The lighting conditions and the visibility of the parked truck can reduce the ability of other road users to detect the truck, seeing it too late to take an evasive action, leading to a road accident.

We attempt to know if the parked truck was at the origin of the accident or if it was an aggravating factor. To do this, we made an assumption. We study the road accident without truck and we analyse the other vehicle kinematics.

For example: SR130 - “Accident happened during the night on local road. Driving directions on this local road were not separated with painting marks. The road surface was dry and it was still dark. A passenger car drove from the town centre. In a sharp left curve the passenger car began to slide laterally and rotate. On the straight section of the road, behind the sharp left curve, there was on the right side of the road a stopped heavy truck with semitrailer. The passenger car driver having lost control of his vehicle in this curve crashed into the parked semitrailer. The right side of the passenger car hit the back side of the parked semitrailer. The passenger car driver was slightly injured.”

In this example the passenger car loses control and crashes into the truck parked on the road. If we ignore the truck parked, the passenger car would have still lost control but would have ended its run in the field next to the road. Gravity of this accident would have been reduced. In this example the truck was a passive actor and rather an aggravating “factor”. We judge that a safe truck parking place would have been useful.

The analysis shows that within the sample of 12, in half of the cases, a safe parking place could have been useful to avoid a road accident.

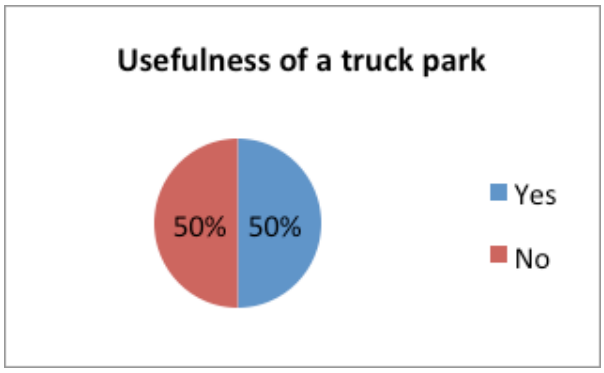

Figure 3:Would a safe parking place have avoided the accident? [sample of 12, ETAC database]

Of the six road accidents where a safe truck parking place would have been useful, half of these parked HGV were at the origin of the accident. They were all parked on the roadway. If trucks were parked on a safe place and not on the road, the accident could have been avoided.

In the other half of road accidents in which a safe truck parking place would have been useful, the HGVs are considered as passive actors. It is the other vehicles which make a mistake (drowsiness, loss of control …). In these last cases, the accident severity would have been reduced if the truck had not been parked there. It means that the other vehicle would have left the road and/or would have met an obstacle less aggressive than a truck. Two HGV were parked on roadside and one was parked on roadway.

Five of these six road accidents occurred at night or at twilight/dawn and one occurred at day. On these five road accidents occurring at night, three HGV were not visible.

The other road accidents (6) would not have been avoided by the availability of safe truck parking places.

Three accidents take place when drivers were waiting to load or unload their cargo or to settle some administrative demands.

In one case, the HGV was parked and the driver forgot to tighten the handbrake. The HGV began to move and run over the driver who was walking between his truck and a truck parked in front of him. We consider this case as a human error.

The last two road accidents reflected an error during a specific manoeuvre (reversing in a truck/car parking).

4.1.3 Other Accident factors Related to Parking

Accident factors have been investigated in order to assess the potential impact of safe and secure truck parking on accidents that happen while the vehicles are driving.

ETAC shows that human factors represent 85% of the road accident initiating factors. We know that drowsiness is included in the human factors. We take this factor into account, because safe and secure truck parking places could avoid situations of drowsiness, by being available where and when they are needed, and by ensuring drivers to have a rest or sleep in peace without caring about potential thefts. Drivers are then better rested and can drive again after a beneficial break.

Technical fault represents 5% of the ETAC accidents. We take this factor into account because repair and maintenance services could be offered in combination with safe and secure truck parking places.

According to an analysis conducted by CEESAR in 2004, in which 405 French fatal road accidents involving a truck were studied, we can summarize the main initiating factors in the table below. The first line of the table describes the road accident types.

One Truck involved	**Truck vs. light or commercial vehicle**	**Truck vs. Truck**
Unknown initiating factor linked to the driver	Unknown initiating factor linked to the driver	Inattention
Excessive speed	Excessive or inappropriate speed	Unknown initiating factor linked to the driver
Inappropriate speed	Inappropriate manoeuvre	Excessive or inappropriate speed
Feeling of faintness	Inappropriate visual control	Mis-judgment
Drowsiness	Unknown	Feeling of faintness
	Other action	Technical Faults
	Guidance error	
	Drowsiness	
	Inattention	
	Feeling of faintness	
	Suicide	

Table 1: Main initiating factors in fatal road accidents involving a truck [CEESAR]

Unknown initiating factors linked to the driver are explained by drivers killed in the accident and for whom we have no explanation about the error committed.

In the road accidents involving a truck and a light or commercial vehicle, the initiating factor is often linked with the light or commercial vehicle driver.

Drowsiness and technical faults are in the top 5 or 10 road accident initiating factors, in this study.

4.1.3.1 DROWSINESS

According to the ETAC final report, 6% of the 624 accidents were ascribable to drowsiness. When we only consider the truck drivers, 3% of them were ascribable drowsiness.

4.1.3.2 TECHNICAL FAULTS

Some information is available in the ETAC database, such as: compliance with mandatory technical inspection; steering equipment defects; suspension defects; brake defects; wheels and tyre defects.

- 4% of vehicles (trucks + trailers) do not have the mandatory inspection done. (Number of vehicles taken into account = 722 trucks + 433 trailers = 1155 vehicles)
- 1% of the trucks have defects in steering (Number of trucks taken into account = 722 trucks). In 17% of these cases, the defect had an influence on the genesis of the accident, and in further 67% it may have had an influence on the genesis of the accident.
- 0.5% of the vehicles have suspension defects, which means only 7 road accidents (Number of trucks/trailers taken into account = 1155). These suspension defects had an effect on one of these cases only (14%).
- 1% of the vehicles have brake defects (Number of trucks/trailers taken into account = 1155). In 86% of these cases, the defect had an influence on the genesis of the accident.
- 2% of the vehicles have a defect on wheels/tyres (Number of trucks/trailers taken into account = 1155). In 50% of these cases, the defect had an influence on the genesis of the accident.

The total number of accidents related to technical defects of the heavy goods vehicles is thus estimated to be 2.5% maximum.

4.1.4 CONCLUSION FOR THE IMPACT ASSESSMENT

It results from the examination of the ETAC database:

- 2% of accidents involve a parked truck. Half of these involved a truck parked offsite, and could have been avoided with safe and secure parking.
- 3% of accidents involve drowsiness of the truck driver, to the prevention of which safe and secure parking would contribute.
- 2.5% of the accidents involve vehicle failure, to the prevention of which safe and secure parking could contribute if it were combined with repair and maintenance services For each type of defect, only few vehicles are concerned. But certain technical faults are frequent road accident causes such as brakes defects.

The CARE database indicates that in 2011, road traffic accidents in the Member States of the European Union have claimed about 34,000 lives and left more than 1.1 million people injured, representing estimated costs of 140 billion Euros. Trucks are involved in 13% of accidents with victims.

Extrapolating the results of the above analysis to this total volume of accidents yields:

Cause:	*Offsite parking*	*Drowsiness*	*Vehicle failure*
	1%	3%	2,5%
Fatalities	44	132	110
Injuries	1,430	4,290	3,575

This extrapolation represents a total accident volume on all roads, with respect to which the potential saving that could be reached through efficient measures in favour of safe and secure truck parking can be apprehended. The potential saving will be only a certain share of this total volume.

The share will have to be estimated, for each deployment option in the impact assessment, based on assumptions of how much HGV travelling is done on roads where information and reservation services on s+sTPA are offered, and on how many of the off-site parking, drowsiness and vehicle failure situation would be eliminated.

4.2 Economic loss due to theft

4.2.1 APPROACH

The analysis has been based on a list of potential sources with helpful information or data. The potential sources have been compiled from the previous study on action 3.5, and completed through extensive desk research and through contacts to relevant stakeholders and organisations[5].

The research was targeted on finding original data, derived data (including methodology), expert opinions (including basis), and problems faced in data collection.

The collected information was compiled in comprehensive table formats, with clear references to sources and remarks where possible (see Appendix E).

4.2.2 MAIN STUDIES AND DATA SOURCES

It is clear from the available studies and data sources that measuring the economic impacts quantitatively is difficult because availability of data is scarce.

- The fact that cargo theft is part of organised crime limits the insights that police forces are ready to give.
- Incident reporting is incomplete; several reasons of this fact have been outlined especially by an IRU survey[6].
- There is no central responsibility or effort for establishing a centralised and standardised database.

The analysis shows that where quantitative information is given, it mostly results from circular references to few original data sources:

TAPA EMEA IIS is an incident database used as a source by NEA[7] for the number of incidents and the location of thefts, recorded through voluntary reports.

- The numbers represent only a limited share of reported incidents. The total occurrence of thefts cannot be directly derived.

[5] Contact mails sent to TAPA EMEA, Europol, Eurowatch, IRU, in order to gather information about ongoing projects, new findings or approaches and for information exchange.

[6] IRU, Attacks on Drivers of International Heavy Goods Vehicles, 2008. The survey revealed that for a number of reasons, nearly 30 % of the attacks were not reported. The reasons indicated were lack of trust in authorities, language difficulties, fear of consequences, and others.

[7] NEA (2007): Study on feasibility of organizing a network of secured parking areas for road transport operators on the TERN (final report; country studies)

- There is a regional bias towards Western Europe. The majority of reports are from the UK.
- 27% of cargo theft occurs in situations of non-secure parking.

NEA (cited above) establishes the estimate of €8.2 billions of economic loss due to cargo crime each year[8]. The estimate is based on scientific assumptions, related to the number of loaded trips, and on the statistic that 0.08% of transported loads is subject to theft. The lack of comparable references makes the NEA estimate a preferred source across Europe.

In contrast, the IRU survey (cited above) extrapolates the economic loss to €7.2 billions over a 5 year period.

Some national statistics have been found. They offer more detail, but are not comparable across Member States:

TruckPol[9], for the UK, evaluates the average loss per theft incident to approx. € 45,000, and the total loss in 2010 to € 60 million.

The French police task force OCLDI[10] counts for 2010, 845 incidents with parked vehicles (66.2% of total number of incidents), making up €5.9 million of direct economic loss (21% of the total).

The German Ministry of Transport reports, for Germany, €100 million of economic loss, with 70 – 80 stolen trucks[11].

4.2.3 Conclusions for the Impact Assessment

The results of the analysis show that monetary quantifications about freight crime for the EU can only be made using strong assumptions. However, the fact that cargo theft is considered by police forces across the EU to be part of organised crime implies that the losses (and criminal gains) from cargo theft are potentially substantial.

The evidence does not afford a clear quantifiable link between crime and parking. For this reason it is not clear that implementation of information and reservation services for secure truck parking is capable of reducing

[8] The estimate includes direct and indirect losses, as well as a figure of €450 million for undeclared thefts. The estimate applies to the base year 2004, but the authors of the study assume that it remains stable.

[9] TruckPol annual reports (2007 – 2010, + 2011 quarterly reports)

[10] Office central de lutte contre la délinquance itinérante (2007-2010): Fiches thématiques

[11] BMVBS (2012): Information about safe and secure truck parking, presentation to DG MOVE

freight crime, and certainly no indication can be found about the potential extent of any such reduction.

4.3 Costs

Cost figures researched as a basis for the cost/benefit analysis are presented below.

The figures are based on[12]:

- The previous study [ref 2],
- Extrapolations from recent reports,
- Stakeholder input collected during the interviews.

It has to be noted that the costs of data collection are subject to particular uncertainty due to the fact that the technologies and their markets are not mature.

	Minimum	Maximum	Unit
Data collection			
Inductive loops Implementation	2'300	6'200	€/site
Operation	390	620	€/site/year
Access control counting /Implementation	100'000	170'000	€/site
Operation			
In pavement sensors / Implementation	100'000	170'000	€/site
Operation			
VMS			
Implementation	40'000	93'000	€/VMS
Operation	1'800	4'700	€/VMS/year
European Information system			
Implementation			
Operation	100'000	300'000	€/year
Reservation system TPA			
Implementation	8'000	12'000	€/system
Operation	4'000	20'000	€/year
Central reservation service			
Implementation	50'000	100'000	€/system
Operation	40'000	80'000	€/year

Table 1: Indicative cost figures for the cost/benefit analysis

[12] See List of Sources in Appendix A

5 Definition of Deployment Options for the Impact Assessment

5.1 Problem definition

A formal problem definition for the purpose of the impact assessment has been elaborated by DG MOVE in January 2012[13]. The main problems to be addressed are described as follows:

> "The existing capacity of truck parking areas along the main Core European transport corridors is not utilised efficiently everywhere in the Member states. This utilisation is not optimal because truck drivers or transport companies do not have access to dynamic information about the availability of parking places in order to make the optimal decision where to park, and to comply with driving time rules. Periodically, some truck parking areas are overloaded, while other areas nearby, which could be reached still within the drivers' time limit, can have empty places. This situation is expected, all other things being equal, to occur more often in the future due to the expected growth in road freight transport.[14]
>
> For truck drivers who need to comply with rules on working time (Regulation EC 561/2006), this means that they cannot be sure to find an adequate (safe and secure) parking space. This can lead to unauthorised parking (offsite parking e.g. on hard shoulder), or some drivers take the risk to continue driving and violate the rules on working time. It would further constitute a deterioration of the working conditions for drivers with potentially serious consequences in terms of road safety.
>
> Duly informing the truck drivers of the availability of (safe and secure) parking places and allowing them to book a parking place would help them to take informed decisions for their parking obligations, taking into account the security concerns and the welfare of drivers.
>
> In today's situation, the ownership and management of truck parking areas along the main EU roads is split between public (road

[13] DG MOVE (2012) Roadmap, Provision of information and reservation services for safe and secure parking for trucks and commercial vehicles (internal document)

[14] Note of the authors: In the reference scenario of the impact assessment accompanying the White Paper on Transport, total freight transport volumes are expected to grow by about 38% between 2005 and 2030, with road and rail growing at comparable rates (SEC(2011) 358 final, page 137).

authorities) and private (e.g. based on concessions) entities. With very few exceptions such as e.g. the "truckinform" or "Transpark" websites, which provide the location of parking facilities on main EU axes, there is no systematic collection of relevant and harmonised information regarding each parking facility (such as total number of existing parking places; periodic count of available parking places, security level of parking areas, etc.).

The shortcomings of the current information system on parking facilities along the main road axes in Europe are due to the following reasons:

1. There is no extensive up-to-date inventory of suitable, safe and secure parking places for trucks based on harmonised classification of facilities along the main European road axes;
2. There is very little dynamic information available on free parking places in the different TPA's for trucks and commercial vehicles;
3. There is no minimum definition for how users can access information on safe and secure parking places. In addition, even those very few facilities that have put in place mechanisms to monitor in dynamic their truck parking occupancy, do not yet give access to this information to other parties that could further disseminate it to truck drivers (e.g. private or public traffic information service providers), of even to the truck drivers themselves."

The range of stakeholders concerned by the problem is presented in Deliverable D2[15]. The list comprises:

- Public (association of) road authorities, public/private (association of) road operators
- Parking area providers, parking area operators (public/private)
- Unions of truck drivers,
- Associations of hauliers,
- Insurance companies,
- Police forces
- Cargo owners,
- Information service providers, reservation service providers,
- Content and service aggregators
- Navigation and fleet management solution providers
- Petrol Card providers,

[15] Deliverable D2 – Stakeholders Consultation Report, p.37.

- Truck manufacturers
- Parking equipment suppliers.

5.2 Identification of Policy Objectives

The core objective deriving from the above problem definition is to **optimise the use of existing parking capacity**.

This will contribute to the general objectives of increasing road safety and security of transport and the welfare of drivers, and minimizing the environmental impact of road transport.

The specific objectives deriving from the particular drivers of the problem are listed below:

Drivers of the problem	Specific Objectives
1. No harmonised extensive updated inventory of suitable safe and secure parking	• Define a harmonised data structure for inventory of s+s TPA • Define harmonised procedures to collect static data on s+s TPA
2. Little dynamic information on free parking spaces in TPA (few areas are equipped)	• Define specifications covering functional, technical and organisational provisions for dynamic data collection and exchange • Define an appropriate scope for implementation
3. No minimum definition on how users can access information on safe and secure parking	• Define guidelines and specifications how to disseminate information on s+s parking to end-users and how they access the information • Define an appropriate scope for implementation
4. No harmonised way to reserve a parking space	• Establish specifications for a reservation service: based on existing standards and technologies • Ensure compatibility, interoperability and continuity of services • Define an appropriate scope for implementation

Table 2: Specific objectives

5.3 Deployment Options

5.3.1 OVERVIEW

Id	Description
I.	• Baseline Scenario – No EU intervention
II.	• Specifications for voluntary deployment of static database • Dissemination to end users is left to MS • Deployment of additional, dynamic ITS in priority zones is left to MS
III.	• Specifications for voluntary deployment of static database, including provisions for dissemination through service providers • Specifications for voluntary deployment of additional, local dynamic ITS in priority zones where capacity can be used more efficiently and this circumvents negative impacts leading to avoidance of the zone
IV.	• Specifications for mandatory deployment of static database • Dissemination to end users is left to Member States • Deployment of additional, dynamic ITS in priority zones is left to MS
V.	• Specifications for mandatory deployment of static database, including provisions for dissemination through service providers • Specifications for mandatory deployment of additional, local dynamic ITS in priority zones where capacity can be used more efficiently and this circumvents negative impacts leading to avoidance of the zone
VI.	• Option III. + Specifications for voluntary deployment of reservation services
VII.	• Option V. + Specifications for voluntary deployment of reservation services

Table 3: Options considered in the impact assessment

5.3.2 OPTION I. BASELINE SCENARIO

In the baseline scenario, there is no EU intervention.

5.3.3 OPTION II. SPECIFICATIONS FOR VOLUNTARY DEPLOYMENT OF STATIC DATABASE

The EU adopts specifications under the ITS Directive.

The specifications lend guidance to voluntary implementation of a static database on s+sTPA[16].

The specifications apply to any operator, public or private, who operates a database containing relevant s+sTPA that are on the TERN, near the TERN, and in pre-urban areas, according to criteria defined in the specifications. Existing databases must be made compliant within a prescribed time period.

The specifications prescribe the static data items (some mandatory, some optional), the geographic reference model and the time validity model, as well as functional and technical interface specifications.

The specifications do not prescribe any institutional responsibilities, nor how data should be made available to service providers. They do not contain rules or recommendations for delivery and display of the static information on end user devices, nor on signs along the road.

5.3.4 OPTION III. SPECIFICATIONS FOR VOLUNTARY DEPLOYMENT OF STATIC DATABASE, INCLUDING PROVISIONS FOR DISSEMINATION THROUGH SERVICE PROVIDERS, AND FOR VOLUNTARY DEPLOYMENT OF DYNAMIC ITS

The EU adopts specifications under the ITS Directive. The specifications contain the guidance to voluntary implementation of a static database on s+sTPA as in Option II.

In addition, they prescribe harmonised rules for data access by service providers. They *may* contain prescriptions or recommendations on the delivery and display of the static information on end user devices, as well as on signs along the road.

[16] See terms and definitions in section 1.5.

Also, the specifications define functional and technical requirements for deployment of dynamic information, and terms for access to dynamic data by service providers. They may contain prescriptions or recommendations on the delivery and display of the dynamic information on end user devices and on VMS.

The choice of where to deploy dynamic information, and related organisational provisions, are left to MS.

5.3.5 OPTION IV. SPECIFICATIONS FOR MANDATORY DEPLOYMENT OF STATIC DATABASE WITH THE DISSEMINATION TO END USERS IS LEFT TO MEMBER STATES

The EU adopts specifications that contain the same functional and technical guidance to implementation of a static database on s+sTPA as in Option II. In addition, the responsibility for implementation is allocated to the Member States within their respective territories. Each MS determines within its jurisdiction how to allocate the responsibility for building up and operating the database.

The database must contain all relevant s+sTPA that are on the TERN, near the TERN, and in pre-urban areas, according to criteria defined in the specifications.

The MS are responsible for ensuring the financing, the creation and the operation of the static database. The interface specifications are based on the assumption that the TPA operators have an obligation to collect and provide the static data on their areas at their own cost, including updates, while the MS funds the database infrastructure. MS may adopt different rules of cost allocation.

Service providers have access to the Member States' databases in accordance to the public service information legislation (PSI Directive 2003). No other rules or recommendations are prescribed for delivery and display of the static information on end user devices, nor on signs along the road.

The specifications do not address dynamic information on s+sTPA.

5.3.6 OPTION V.
SPECIFICATIONS FOR MANDATORY DEPLOYMENT OF STATIC DATABASE, INCLUDING PROVISIONS FOR DISSEMINATION, AND FOR MANDATORY DEPLOYMENT OF DYNAMIC ITS AT SPECIFIC LOCATIONS

The EU adopts specifications that prescribe the deployment of static data as in Option IV.

In addition, it is prescribed that access to static s+sTPA data is free of charge for service providers. The specifications may contain rules or recommendations for delivery and display of the static information on end user devices, and on signs along the road. The MS' minimal obligation is to ensure that their static database is available on the web for pre-trip information, and allow for multilingual comprehension.

The specifications define criteria for identifying Priority Zones for ITS Parking[17], as well as a minimum level of coverage for dynamic information on s+sTPA in priority zones. Member States are obliged to deploy the minimal coverage of dynamic ITS. Further deployment of dynamic ITS is left to the MS' choice.

The technical and functional content of the specifications concerning dynamic information is as in Option III.

5.3.7 OPTION VI.
SPECIFICATIONS FOR VOLUNTARY DEPLOYMENT OF STATIC DATABASE, INCLUDING PROVISIONS FOR DISSEMINATION THROUGH SERVICE PROVIDERS (OPTION III.) + FUNCTIONAL SPECIFICATIONS FOR RESERVATION SERVICES

The EU adopts specifications as in Option III. In addition, the specifications contain functional, organisational and technical prescriptions for the implementation of reservation services for s+sTPA. The deployment of reservation services is optional.

[17] See section 1.5 for terminology.

5.3.8 OPTION VII.
SPECIFICATIONS FOR MANDATORY DEPLOYMENT OF STATIC DATABASE, INCLUDING PROVISIONS FOR DISSEMINATION, AND FOR MANDATORY DEPLOYMENT OF DYNAMIC ITS AT SPECIFIC LOCATIONS (OPTION V.) + FUNCTIONAL SPECIFICATIONS FOR RESERVATION SERVICES

The EU adopts specifications as in Option V., plus those on reservation as in Option VI.

6 Analysis of Impacts

6.1 Economic, Social and Environmental Impacts

The following impacts are considered[18]:

Economic Impacts	Expected Impact
• Functioning of the internal market/competition	Harmonised information on s+sTPA contributes to develop the internal market for road transport. It helps to prevent unequal enforcement of driving time and parking offenses.
• Competitiveness, trade and investment flows	Planning of trips and securing on-trip needs leads to more reliable transport and reduces time for parking, data harmonisation makes processes more efficient
• Operating costs	There are cost savings as well as additional costs. Administrative burdens on businesses concern TPA operators. Detailed analysis in section 6.2, Analysis of impacts on stakeholders.
• Administrative burdens on businesses	
• Budgetary implications for public authorities	
• Impact on property rights	No impact expected
• Innovation and research	Stimulating research for relevant IRS technology
• Consumers and households	No impact expected. Detailed analysis in section 6.4 and Appendix I.
• Specific regions or sectors	s+sTPA contributes to traffic management on corridors with high traffic
• Third countries and international relations	No impact expected
• Macroeconomic environment	No impact expected
Social/Safety Impacts	**Expected Impact**
• Employment and labour market	Improvement of working conditions and welfare of drivers, increased attractiveness of this profession. Detailed analysis in section 6.4 and Appendix I.
• Standards and rights related to job quality	
• Social inclusion	No impact expected
• Gender equality	No impact expected
• Individuals, private and family life	No impact expected
• Governance, participation	No impact expected

[18] Source : European Commission (2009), Impact Assessment Guidelines.

• Public health	Prevention of accidents related to offsite parking, to drowsiness, and to stress
• Crime, terrorism and security	Possible prevention of thefts and robberies
• Effects on social protection, health, education	No impact expected
• Culture	No impact expected
• Social impacts in third countries	No impact expected
Environmental Impacts	**Expected Impact**
• Climate	Reduced emissions – less km circling for space
• Transport and use of energy	Reduced energy use – less km circling for space
• Air quality	Reduced emissions – less km circling for space
• Biodiversity	No impact expected
• Water quality and resources	No impact expected
• Soil quality or resources	No impact expected
• Land use	Possibly reduced need for building new TPA
• Renewable or non-renewable resources	No impact expected
• Environmental consequences firms + consumers	No impact expected
• Waste production	No impact expected
• Scale, likelihood of environmental risks	Prevention of accidents, especially with hazardous goods
• Animal welfare	No impact expected
• International environmental impacts	No impact expected

Table 4: List of economic, social and environmental impacts

The relevant impacts are assessed for each deployment option (see Appendix F). They are ranked in comparison to the baseline scenario between -2 (strong negative impact), 0 (neutral) and +2 (strong positive impact). The baseline scenario has a reference score of 0 for all impacts.

Appendix F leads to following observations:

- Impacts are generally positive in all three categories: economic, social and environmental.
- Some negative impact rankings arise inside the category of economic impacts, on the items of operating costs, administrative burden and

budgetary implications, in those scenarios where the specifications lead to mandatory deployment. However, the negative rankings are more than compensated by the positive rankings related to the gains for the internal market, for the competitiveness of the haulage industry, and for regions with particular truck parking problems.

- The social and environmental impacts become significant only for those scenarios where the specifications lead to mandatory deployment. They are small when deployment is voluntary.
- The pairwise comparison of the respective scenarios with and without reservation (III./VI. and V./VII.) shows that including reservation clearly improves the total ranking in the case of voluntary deployment (III./VI.), while the total ranking remains the same in the case of mandatory deployment (V./VII.). This illustrates the fact that once dynamic information is effective in a priority zone, the additional benefit of reservation services is not obvious for all parking operators and all hauliers. This point will need further attention when the specifications are drafted.

The aggregated ranking for each scenario is summarised below:

Scenario	I.	II.	III.	IV.	V.	VI.	VII.
Economic impacts	0	1	2	2	5	3	4
Social/Safety impacts	0	0	0	4	8	3	8
Environmental impacts	0	1	1	3	4	3	5
Total	**0**	**2**	**3**	**9**	**17**	**9**	**17**

Table 5: Aggregated rankings from Appendix F.

6.2 Impact on Stakeholders

The table below summarises the key business goals and requirements of the affected stakeholders. To obtain commitment from all key stakeholders, a business model is required that will at least meet their business requirements, while not causing harm to their business goals.

	Key business goals	Business requirements
Driver	Efficient driving	Avoid searching and waiting time, avoid stress and fatigue
	Parking comfort	Facilities
	Safety	Prefer safe TPA
	Minimise hassle with transactions related to parking (information reservation, payment)	Avoid to pay TPA on personal expenses
TPA operator	Maximise turnover (private TPA)	Maximise occupancy
	Provide sufficient capacity (public TPA)	Avoid misuse for other logistic purposes than parking
	Reputation	Avoid on-site crime
	Limit investments	Ensure visibility and attractiveness of TPA
	Limit operational costs	Avoid vandalism, rowdy behaviour
Road authority	Road safety	Avoid off-site parking and queuing, avoid excess of driving times, Monitor TPA situation
	Optimal traffic flow	Avoid off-site parking and queuing
Haulier	Efficient daily operations : optimise driving time and distance, minimise parking fees and fines, efficient and flexible trip planning	Avoid searching and waiting time
	Driver safety	Avoid theft and robbery
	Vehicle safety	Avoid theft and robbery
	Cargo safety	Avoid theft and robbery
Cargo owner	Cargo safety	Avoid theft and robbery
Insurance company	Cargo, vehicle and driver safety	Well-defined responsibilities in case of damage event

These impacts are assessed for each deployment option (see Appendix G). They are ranked in comparison to the baseline scenario

between -2 (strong negative impact), 0 (neutral) and +2 (strong positive impact). The baseline scenario has a reference score of 0 for all impacts.

Appendix G leads to following observations:

- The rankings are positive for all stakeholders except TPA Operators and Insurance companies.
- The most critical situation concerns the TPA operator. Co-operation of the TPA operator is critical for collecting occupancy data for the information and reservation services, and for granting the availability of reserved parking spots. However, fulfilment of this critical role by the TPA operator conflicts with two of his key business goals; to limit investments and operational costs.
- On the basis of what has been learnt in the stakeholder consultation (insurance companies are not decisive actors for information and reservation services for s+s truck parking), the impact on insurance companies is assessed to be zero.
- The impacts become significant only for those scenarios where the specifications lead to mandatory deployment. They are small when deployment is voluntary.
- In particular, the mandatory deployment of dynamic information is the most discriminating factor for the impacts on road authorities and hauliers.
- As for the economic, social and environmental impacts, the additional benefit of reservation services is not obvious once dynamic information is mandatorily deployed in priority zones. This point will need further attention when the specifications are drafted.

The aggregated ranking for each scenario is summarised below:

Scenario	I.	II.	III.	IV.	V.	VI.	VII.
Driver	0	0	1	3	4	2	3
TPA Operator	0	1	1	1	1	2	1
Road authority	0	0	0	1	4	0	4
Haulier	0	0	0	4	8	1	8
Cargo owner	0	0	0	1	1	1	2
Insurance company	0	0	0	0	0	0	0
Total	**0**	**1**	**2**	**10**	**18**	**6**	**18**

Table 6: Aggregated rankings from Appendix G.

6.3 Impact on Existing Markets and Services

The expected market evolution induced by each deployment option has been analysed and described in qualitative terms. The description can be found in Appendix H.

The analysis shows that information and reservation services for safe and secure truck parking are expected to be a minor application in the wider context of the markets for communication between vehicles and central services, and for mobile and in-vehicle devices. Hence they should be expected to have to adapt to the big trends in these markets without influencing them significantly.

6.4 Special Impacts

The deployment options have been assessed with regard to a list of special impacts. The full analysis can be found in Appendix I.

The summary of the assessment is as follows:

Special impact	Synthesis of assessment
Fundamental rights	• Data protection is relevant for dynamic information and for reservation services; existing regulations are sufficient.
Number and quality of jobs	• The impact on fair and just working conditions is positive for all options • It is increased for options with dynamic information and reservation services
Indirect impacts on end-users and households	• Prices for transported goods will not be affected.
Liability	• Faulty dynamic data may cause economic prejudice to TPA operators or hauliers.
Inappropriate use	• Potential misuse of reservation services (systematic no-shows)
Cost effectiveness	• Extensive static information, and dynamic information in priority zones is cost-effective • Evidence for assessing cost effectiveness of reservation services is insufficient.
Administrative burden	• There is administrative burden for the definition and management of responsibilities on MS level.
Impact on third countries	• Using the services will not be restricted to EU member drivers, and accessibility to the service can be acquired at the same costs for all drivers.

Table 2: Summary of the assessment of special impacts.

6.5 Compliance with Principles Set Out in the ITS Directive

The deployment options have been assessed with regard to the principles set out in Annex II of Directive 2010/40/EU. The full assessment can be found in Appendix J.

It summarises as follows:

Principle	Synthesis of assessment
(a) Be effective	• All deployment options are assessed positively under the aspect of economic, social/safety and environmental impacts (see section 6.1)
(b) Be cost-efficient	• Cost effectiveness is given for extensive static information and for dynamic information in priority zones • Not granted yet for reservation services
(c) Be proportionate	• The optimal compromise between homogeneity of service and selective deployment needs to be found. • The deployment options distinguish the service types of static information, dynamic information, and reservation, the spatial scope of deployment of each service, and the voluntary or mandatory character of the specifications for each service.
(d) Support continuity of services	• Granted for static information under mandatory deployment (options IV. to VII.) • There is an issue of continuity for dynamic information, where a priority zone is located on a cross-border corridor • Not granted yet for reservation services
(e) Deliver interoperability	• The specifications will ensure full interoperability
(f) Support backward compatibility	• The integration into shared systems of legacy systems for dissemination, VMS in particular, will be important when deploying dynamic information in priority zones. • The specifications should ensure sufficient flexibility or time lapses for allowing existing legacy systems to be renewed in accordance with their own lifecycle.
(g) Respect existing national infrastructure and network characteristics	• All options respect the existing parking infrastructure. • The deployment of dynamic information respects the characteristics of the networks
(h) Promote equality of access	• No issue. The services target professional drivers, which are not considered as vulnerable road users.
(i) Support maturity	• Technology is mature for static information. • There is a risk of slow market development for dynamic data collection systems. • There is a risk of non-emergence of a widely accepted standard for reservation services.
(j) Deliver quality of timing and positioning	• The deployment options are fully compatible with the use of satellite-based technology for timing and positioning.
(k) Facilitate intermodality	• Safe and secure parking is focussed on road transport. • Intermodality will be facilitated if zones with high truck parking demand in the vicinity of important intermodal terminals are in the scope of the specifications (e.g. seaports; this often coincides with peri-urban zones).
(l) Respect coherence	• All options will respect existing rules, policies and activities.

Principle	Synthesis of assessment
	• Member States have the possibility to publish static data on truck parking areas by means of tools and procedures set up in the context of the INSPIRE directive.

Table 3: Summary of the assessment of compliance with the principles set out in the ITS Directive.

6.6 Risks

The following table shows the risks identified for three types of service that compose the deployment options.

Category	Static data	Dynamic data	Reservation service
Institutional risk			
• related to Member States	• Slow or non-compliance with set-up of static database	• Lack of commitment for implementation of dynamic information in selected corridors • Lack of money for covering a reasonable share of costs	• None
• related to decentralised road authorities and public TPA operators	• Slow or non-compliance with obligation of declaring TPAs • Insufficient quality of TPA data	• Diverging or conflicting priorities for heavy vehicle traffic management in a given priority zone • Lack of money for covering a reasonable share of costs	• Diverging or conflicting priorities for heavy vehicle traffic management in a given priority zone • Unwillingness to organise and to incur costs for handling of reservations (e.g. in case of sufficient occupancy)
Market risk			
• related to private TPA operators	• Slow or non-compliance with obligation of declaring TPAs (e.g. in case of sufficient TPA occupancy) • Insufficient quality of TPA data	• Unwillingness to implement dynamic information alongside with competitors, fear of market distortion • Lack of money for covering a reasonable share of costs	• Unwillingness to organise and to incur costs for handling of reservations (e.g. in case of sufficient occupancy)
• related to	• None	• None	• Insufficient business

Category	Static data	Dynamic data	Reservation service
service providers			margin
• related to cargo owners, hauliers and drivers	• Lack of interest in services (e.g. due to bad data quality, insufficient hard TPA capacity, to high prices)	• None	• Lack of interest in service (e.g. due to high cost, or to loss of flexibility)
Technology risk			
• related to availability of standards and systems	• None	• Slow market development for data collection systems (long period of high prices and uncertain performance)	• Failure to define a widely accepted standard for handling reservation requests

Table 4: Risk assessment

7 Comparison of key deployment options

7.1 Mapping of impacts

The present section summarises the results of chapter 6 by means of a horizontal comparison between the deployment options defined in chapter 5.

7.1.1 Economic, Social/Safety and Environmental Impacts

The aggregated rankings of economic, social/safety and environmental impacts, assessed as described in section 6.1, are repeated in the table below.

Observations:

- All deployment options rank positively.
- The dominant rankings are in the category social/safety.
- The impacts are strongly related to the mandatory character of the deployment: of static information (option IV) as well of dynamic information (options V and VII).
- The pairwise comparison of the respective scenarios with and without reservation (III. /VI. and V./VII.) shows that once dynamic information is effective in a priority zone, the additional benefit of reservation services is not obvious for all parking operators and all hauliers.

Scenario	I.	II.	III.	IV.	V.	VI.	VII.
Economic impacts	0	1	2	2	5	3	4
Social/Safety impacts	0	0	0	4	8	3	8
Environmental impacts	0	1	1	3	4	3	5
Total	**0**	**2**	**3**	**9**	**17**	**9**	**17**

Table 7: Aggregated rankings on economic, social/safety and environmental impacts (identical to Table 5). Dominant rankings are highlighted.

7.1.2 IMPACTS ON STAKEHOLDERS

The aggregated rankings of impacts on stakeholders, assessed as described in section 6.2, are repeated in the table below.

Scenario	I.	II.	III.	IV.	V.	VI.	VII.
Driver	0	0	1	3	4	2	3
TPA Operator	0	1	1	1	1	2	1
Road authority	0	0	0	1	4	0	4
Haulier	0	0	0	4	8	1	8
Cargo owner	0	0	0	1	1	1	2
Insurance company	0	0	0	0	0	0	0
Total	**0**	**1**	**2**	**10**	**18**	**6**	**18**

Table 8: Aggregated rankings on impacts on stakeholders (identical to Table 6). Dominant rankings are highlighted.

Observations :

- As for the economic, social and environmental impacts:
  - all deployment options rank positively,
  - the impacts are strongly related to the mandatory character of the deployment
  - the additional benefit of reservation services is not obvious once dynamic information is mandatorily deployed in priority zones.
- TPA operators and insurance companies have low or zero rankings. They will not be drivers of the deployment. The most critical situation concerns the TPA operator, because his co-operation is critical for collecting occupancy data and for granting the availability of reserved parking spots.

7.1.3 IMPACT ON EXISTING MARKETS AND SERVICES

The horizontal comparison of the impacts, assessed as described in section 6.3, yields the table below.

Scenario	I.	II.	III.	IV.	V.	VI.	VII.
Impact on existing markets and services (see section 6.3)	Existing databases on s+sTPA continue to be operated on an unstable financial basis. Implementations of dynamic information are legacy systems plus isolated flagship operations in specific, opportunistic situations. Reservation services for s+sTPA continue to exist only in particular situations.	A limited number of databases will cover most s+sTPAs. Service providers increasingly access and use the data by means of bilateral agreements with database operators. Beyond the continued operation of legacy systems, the uptake of dynamic ITS to effectively distribute excess demand across all available TPA is minor. Reservation services exist in specific situations.	The collection of static data develops as in Option II. While the coverage remains patchy, the integration in navigation and fleet management services is accelerated. The uptake of dynamic information services is accelerated. Reservation services continue to exist in specific situations only. Drivers and hauliers start to systematically use the information on s+sTPA in specific situations.	Static data on s+sTPA becomes systematically available. Data quality improves. Service providers develop multiple products. Some will combine static TPA data with data on remaining driving time extracted from future tachographs. Drivers and hauliers use the information for pre- and on-trip planning. The deployment of dynamic information remains slow. Reservation services continue in specific situations only.	Static information services develop similarly to Option IV. Dynamic information will continue based on legacy systems in a first period. They will be integrated in wider systems when their lifecycle allows it. New implementations will develop according to the organisational and financial terms adopted by MS for each ITS parking priority zone. Access to dynamic data for service providers will develop progressively.	The developments of static and dynamic information services are as in Option III. Reservation services will develop on selected locations and corridors, and progressively generalise in TPAs with parking fees. They become routine practice for certain segments of transport. The relation between reservation services and authority-handed dynamic truck parking management remains unclear.	Reservation services will work in combination with the supply of dynamic occupancy data and in Priority Zones, where capacity management is most critical. Expansion of reservation services advances slowly but steadily.

Table 9: Summary of impacts on existing markets and services.

Observations:

- As for the economic, social and environmental impacts:

- all deployment options rank positively,
- the impacts are strongly related to the mandatory character of the deployment
- the additional benefit of reservation services is not obvious once dynamic information is mandatorily deployed in priority zones.

- TPA operators and insurance companies have low or zero rankings. They will not be drivers of the deployment. The most critical situation concerns the TPA operator, because his co-operation is critical for collecting occupancy data and for granting the availability of reserved parking spots.

7.1.4 SPECIAL IMPACTS

The assessment is described in section 6.4, where a summary across all deployment options is given also. The main elements for each deployment option are given in the table below.

Scenario	I.	II.	III.	IV.	V.	VI.	VII.
Special impacts (see section 6.4)	Working conditions of drivers are not improved.	Tendentially positive impact on fair and just working conditions. Administrative burden for MS limited to voluntary actions.	Tendentially positive impact on fair and just working conditions. Administrative burden for MS limited to voluntary actions.	Positive impact on fair and just working conditions. Administrative burden for definition and management of responsibilities at MS level. Extensive static information is cost-effective. Prejudice to TPA operators through faulty dynamic data must be addressed.	Positive impact on fair and just working conditions. Administrative burden for definition and management of responsibilities at MS level. Extensive static information and dynamic information in priority zones is cost-effective. Prejudice to TPA operators through faulty dynamic data must be addressed.	Positive impact on fair and just working conditions. Administrative burden for definition and management of responsibilities at MS level. Evidence for assessing cost effectiveness of reservation services is insufficient. Prejudice to TPA operators through faulty dynamic data and through no-shows must be addressed.	Positive impact on fair and just working conditions. Administrative burden for definition and management of responsibilities at MS level. Evidence for assessing cost effectiveness of reservation services is insufficient. Prejudice to TPA operators through faulty dynamic data and through no-shows must be addressed.

Table 10: The main elements of "Special impacts" for each deployment option.

7.1.5 COMPLIANCE WITH THE PRINCIPLES SET OUT IN THE ITS DIRECTIVE

The assessment is described in section 6.5, where a summary across all deployment options is given also. All deployment options are assessed as generally compliant with the principles. Some specific issues are indicated in the table below.

Scenario	I.	II.	III.	IV.	V.	VI.	VII.
Compliance with principles set out in ITS directive (see section 6.5)	--	Impacts are small. Continuity of service is not granted.	Impacts are small. Continuity of service is not granted.	--	For dynamic information, the scope of mandatory deployment is critical.	There is insufficient evidence for assessing cost effectiveness.	There is insufficient evidence for assessing cost effectiveness.

Table 11: Specific issues regarding the compliance with the principles set out in the ITS directive.

7.1.6 RISKS

The assessment is given in section 6.6. The main risks for each deployment are indicated in the table below.

Scenario	I.	II.	III.	IV.	V.	VI.	VII.
Main risks (see also section 6.6)	--	Slow and fragmentary deployment, lack of interest in resulting service.	Slow and fragmentary deployment, lack of interest in resulting service.	Insufficient compliance of Member States and TPA operators	Diverging priorities between MS, road operators and TPA operators Lack of agreement on funding	Unwillingness of TPA operators to organise and to incur costs for handling of reservations.	Unwillingness of TPA operators to organise and to incur costs for handling of reservations

Table 12: Main risks identified for each deployment option.

7.2 Trade-offs and synergies

Three issues emerge from the analysis.

7.2.1 Extensive or Selective Deployment

A first trade-off is between an extensive and selective deployment of information and reservation services.

By extensive deployment, it is meant that the coverage of the services should include all roads of the TERN (and possibly beyond the TERN). It is clear that extensive deployment drives the costs upwards, while the marginal benefit of covering a minor truck parking area on a minor road gets smaller and smaller.

By selective deployment, it is meant that the coverage is targeted on where the demand for information and reservation is highest, and where the benefit is highest. Costs may be limited in this way, but the service is not continuous.

The approach for resolving the trade-off taken in the deployment options is to distinguish:

- the service types: static information, dynamic information, reservation,
- the spatial scope of deployment of each service,
- the voluntary or mandatory character of the deployment for each type of service.

According to the analysis of impacts, the recommended compromise is:

- Extending the deployment of static information to all TPAs that serve the truck traffic on the TERN; there is an economy of scale in the central database infrastructure, and the perceived usefulness of the service increases with the density of TPAs. The perceived service level on the TERN by drivers and hauliers will improve, in synergy with the impact of other services that are developed on the TERN.
- Selecting priority zones for dynamic information. The priority zones will often coincide with zones where other ITS traffic management measures are frequent. This is a potential for synergy.

Concerning reservation services, the optimal resolution of the trade-off cannot be identified yet on the basis of the available analysis.

7.2.2 SPECIALISED OR MULTI-PURPOSE AREAS

The second trade-off emerges between addressing dedicated truck parking areas and addressing multi-purpose areas.

A specialised area can be equipped on purpose for data collection, access control, security and comfort features intended for trucks and their drivers. It has a certain minimal size in practice. It may be located next to other functions such as light-vehicle service areas, logistics areas, freight terminals etc, with or without physical separation between the functions..

By multi-purpose area, it is meant that the truck parking function cannot be clearly separated from other functions, or that the separation cannot be materialised or enforced in practice, or would be detrimental for the business model of the overall area.

If the specifications address specialised areas only, then the number of concerned infrastructures is lower. The specialised areas offer a relatively homogeneous service level (at the least, they will be apt to be classified according to LABEL criteria). Addressing specialised areas only creates a synergy with LABEL, and with the development of a market for serviced truck parking.

The drawback of addressing specialised areas only is that information and reservation services will exist only where specialised areas exist. Large parts of the TERN may be absent from the service coverage because the existing truck parking infrastructure is not specialised.

If the specifications address multi-purpose areas also, then the number of concerned infrastructures will be higher, including a wider spectrum of parking situations. The density of the information and reservation services will be higher.

Specialised and multi-purpose areas will have different requirements when it comes to technical equipment. Specialised areas are more appropriate for automation than multi-purpose areas. Automation implies high standards of accuracy in order to provide reliable data for information and reservation services. It requires robust processes for access control in order to ensure correct fulfilment of reservations. It needs a solid business case, especially for reservation, in order to justify the investment in automated equipment.

Multi-purpose areas will be more difficult to automate. High standards of technical accuracy are more difficult to reach. In contrast, human presence

is likely, and provides flexibility when it comes to operational processes, especially to fulfilling reservations. Also, multi-purpose areas represent a wider variety of business cases than specialised areas.

The analysis of impacts speaks in favour of a wide scope of the specifications, in order to maximise the number of trucks that are reached by the information and reservation services, and hence prevented from parking offsite.

Also, the variety of network characteristics speaks in favour of leaving a certain freedom to Member States in this regard.

Therefore, it is recommended to include specialised as well as multi-purpose areas within the scope of the specifications.

7.2.3 Short-Term or Long-Term Reservations?

A third trade-off emerges in relation to parking reservation.

At one end of the spectrum, the primacy of driving time regulation leads to a concept of short-term reservation: it is only when the driving time limit is nearly reached that the driver is able to localise where and when he wants to park. This is when information is most useful, and in case of scarcity of parking offer, when reservation would be most useful. The typical time horizon would be about 30 minutes, the time of arrival can be predicted quite precisely, and the channel would be an in-vehicle device. This situation is of concern for any long-distance driver.

At the other end of the spectrum, the concern of pre-trip planning leads to a concept of long-term reservation. The time horizon of the reservation may be 12 hours as an example, and the arrival time cannot be predicted with certainty. Cancellations will be more frequent. The reservations would often be made by dispatchers via Internet. This situation will be relevant for certain segments of transport only, e.g. goods with high risk of theft.

Given the lack of representativeness of existing reservation services with regard to the variety of needs and situations encountered in reality, it is recommended to leave the specifications open for the full range of needs and situations.

7.3 Preferable options

Option I. is the “do-nothing” scenario. It does not eliminate the inefficient use of truck parking capacity. The trend is that the situation will worsen. All further options have a positive impact as compared to this baseline.

Options II. to VII. foresee the voluntary or mandatory deployment of information and reservation services by means of European specifications. The main conclusions of the analysis are:

- The impacts are strongly related to the mandatory character of the deployment. Voluntary deployment yields small impacts only.
- The most positive impacts related to road safety, and to the working conditions of drivers. This benefits, consequently, the public authorities and the drivers. The economic impacts are positive and benefit mainly the hauliers. There are positive impacts for the environment.
- The benefits are small or nil for further stakeholders (TPA operators, cargo owners, insurers). The most critical situation concerns the TPA operators, because his co-operation is critical for collecting data and for handling reservations.
- The pairwise comparison of the respective with and without reservation (III./VI. and V./VII.) shows that once dynamic information is effective in a priority zone, the additional benefit of reservation services is not obvious for all parking operators and all hauliers.
- Extensive static information and dynamic information in priority zones is cost-effective. For reservation services, the evidence for assessing cost-effectiveness is insufficient.

Options V. and VII. result as preferable options.

Option V., which is characterised by mandatory extensive deployment of static information and mandatory selective deployment of dynamic information, can be seen as a necessary intermediate step towards Option VII.

Option VII includes voluntary deployment of reservation services in addition to what is in Option V. Considering on one hand, the present variety of different reservation service concepts and the still early status of development of standards for reservation transactions, and on the other hand, the need to ensure consistency between dynamic information and reservation, it is recommended to prefer Option V in a first step.

8 Monitoring and Evaluation

8.1 Objectives

This chapter identifies a set of ex-post monitoring indicators, for evaluating the long-term effect of the EC programme towards information and reservation services for truck parking. The core of the EC initiative resides in the specifications; hence, the evaluation should describe the changes generated by the EC specifications, but also take into account the institutional, economic and budgetary context in which the changes take place, in order to raise solid conclusions on the impact of the initiative.

The goal is a high level assessment of the policy impact. The indicators are therefore linked to the policy objectives defined in chapter 5. The core objective is more efficient use of existing TPA capacity.

The proposed indicators should allow for quantitative analysis as much as possible. It is clear from the previous steps of the present study, where the present lack of representative and robust figures had to be noticed repeatedly, that the future monitoring process is the first opportunity to achieve the production of relevant indicators on the evolution and the impacts of information and reservation services on s+sTPAs.

Monitoring indicators should have the following characteristics[19]:

Character	Meaning
1. Relevance	Agreement exists between the association of the indicator and its object of measure.
2.General acceptance – 3. Accepted	The indicator represents its object of measure without ambiguities.
4. Credible – 5. Precise	The indicator represents its means of measurement without ambiguities.
6. Easy	The construction of the indicator and its follow-up is easy and cheap.
7. Proven – 8. Robust	The sources used to construct the indicator are reliable

Table 13: Characteristics of monitoring indicators.

[19] DG ENTR (2006) - "Best report on the use of indicators in the monitoring and evaluation of sme-related actions" - Final report of the expert group.

8.2 List of operational objectives

Starting from the general and specific objectives defined in chapter 5, operational objectives are defined.

Problem	Objective	General Objectives
1. The existing safe and secure parking places for trucks are not used efficiently everywhere on the core network	• Optimise the use of existing parking capacity.	• Increase road safety • Increase road transport security • Increase the welfare of drivers
Drivers	**Specific Objectives**	**Operational Objectives**
1. No harmonised extensive updated inventory of suitable s+sTPA	• Define a harmonised data structure for inventory of s+sTPA • Define harmonised procedures to collect static data on s+sTPA	• Full inventory database of all suitable s+sTPA in the EU, yearly reviewed and updated, able to be centrally stored in a common format, providing all specified mandatory information
2. Little dynamic information on free parking spaces in s+sTPA (few areas are equipped)	• Define specifications covering functional, technical and organisational provisions for dynamic data collection and exchange	• Full coverage of dynamic, dynamic data collection on all s+sTPA in identified priority zones, providing and updating information on availability of parking spaces on s+sTPA. • Data collection (automatic, manual, mixed) has an error margin below 10%
3. No minimum definition on how users can access information on s+sTPA	• Define specifications on dissemination of information on s+sTPA to end-users	• Continuous accessibility of static data for end-users via internet • Continuous accessibility of static and dynamic data for service providers through an interface that allows for integration of data into other standard applications (trip planning, fleet management) • On-board equipments are providing information on s+sTPA to the end-users.
4. No harmonised way to reserve a parking space	• Establish specifications for a reservation service: based on existing standards and technologies • Ensure compatibility, interoperability and continuity of services • Define an appropriate scope for implementation	• Provision of a reservation service for TPA in consistency with information services.

8.3 Monitoring indicators

Based on the operational objectives defined above, the following monitoring indicators are proposed.

The indicators provide quantitative and qualitative elements that will be relevant for evaluating the long- term effect of the EC specifications on the efficient use of TPAs.

The use of all of them or only a selection will depend on what aspects are considered most relevant, and also on available inputs in order to ensure a sufficient representativeness for the analysis.

The complete proposal of indicators can be found in Appendix M. For each indicator, thresholds and target ratings have been specified in order to define the expected rate of success.

Operational Objectives	Indicators
• Optimise the use of existing parking capacity	• Evolution of parking occupancy in priority zones ○S+sTPA with low occupancy ○S+sTPA with exceeding capacities situation
	• Evolution of parking occupancy on scoped road networks
• Increase road safety	• Number of trucks parked offsite on scoped road networks
	• Number of (road) traffic accidents involving a truck parked off-site
	• Number of road fatalities and injured due to accidents involving a truck parked off-site
• Increase road transport security	• Number of cargo theft and attacks on parked truck on-site and off-site
	• Number and localisation of truck drivers attacked while parked on-site and off-site
• Increase the welfare of drivers	• Evolution of working conditions for truck drivers ○Feelings regarding parking process ▪ Evolution of time spent for parking ▪ Evolution of parking planning (when / by whom? / adequacy of planning and reality) ○Knowledge of parking possibilities ○Knowledge of parking characteristics

	○Feelings regarding personal security when parked ○Feelings regarding services provided
Operational Objectives	**Indicators**
• Full inventory database of all suitable s+sTPA in the EU, yearly reviewed and updated, able to be centrally stored in a common format, providing all specified mandatory information	• MS s+sTPA database ○% set up ○% kept up to date ○Overall completeness ○Detailed completeness
	• Number of s+sTPA included ○Overall number of s+sTPA registered ○Number of privately operated s+sTPA registered
• Full coverage of dynamic, dynamic data collection technology on all s+sTPA in extended identified priority zones, providing and updating information on maximum occupancy and free parking spaces on s+sTPA. • Data collection (automatic, manual, mixed) has an error margin below 10%	• Number of identified Priority Zones
	• Number of priority zones implemented and providing dynamic information
	• Number of s+sTPA equipped with dynamic data collection technology
	• Number of s+sTPA providing dynamic information to service providers • Number of s+sTPA providing dynamic information to end-users
	• Number of company providing truck parking data collection equipment
	• Average accuracy of detection technology
	• Average price of detection equipment for 1 truck parking space
• Continuous accessibility of static data for end-users via internet • Continuous accessibility of static and dynamic data for service providers through an interface that allows for integration of data into other standard applications (trip planning, fleet management) • On-board equipments are providing information on s+sTPA to the end-users.	• MS s+sTPA database ○% freely accessible to any other parties for re-use.
	• Number of Services providing truck parking static information
	• Number of Services providing truck parking real time information
	• End-users satisfaction / Driver's point of view/ satisfaction of truck parking information services provided
• Provision of a reservation service in consistency with information service.	• Number of Services providing truck parking reservation
	• End-users satisfaction / Driver's point of view/ satisfaction of truck parking reservation services provided

Context	Indicators
• Take into account the context in which the changes generated by the specifications take place	• Evolution of freight and logistics services ○Number of trip planning and fleet management software which includes truck parking information (idem for reservation service) ○Market penetration of trip planning and fleet management software which includes truck parking information (idem for reservation service) ○Market share of trucks equipped with on-board equipment capable of displaying information (idem for processing a reservation) ○% of equipped truck using truck parking information (idem for reservation service) ○Competitiveness due to parking information and reservation ○Evolution of logistics costs related to parking information and reservation services ○Estimation of energy savings and emissions avoided (fuel consumption) due to the use of parking information and reservation services

Table 14: List of proposed monitoring indicators (see Appendix M for full description).

8.4 Monitoring Means

Based on the monitoring indicators defined above, appropriate means of monitoring need to be defined. The means of monitoring is how the indicators will be determined.

The following means of data collection are considered:

A. Quantitative survey of all implemented projects
B. Qualitative interviews with strategic sample
C. Quantitative telephone-based survey of clients (truck drivers / road haulage companies / logistics operators)
D. Qualitative interviews with other stakeholders
E. Analysis of the national TPA databases
F. Sporadic ad-hoc investigation

The proposed means for each indicator can be found in Appendix M.

The completion of the indicators presented above would require a strong effort of collection from all MS and the EC.

It is recommended:

- To use all or only a selection of the indicators, depending on what aspects are considered most relevant, and also on available inputs in order to ensure a sufficient representativeness for the analysis
- To allocate the collection by means A and E to the Member States, who should provide the results in the general framework of their reporting related to the ITS Action Plan. The collection by means B, C, D and F should be initiated directly by the European Commission.
- To aggregate the indicators in EC-wide progress reports, in accordance with the general monitoring requirements related to the implementation of the ITS Action Plan.

9 Conclusions and Recommendations

Several options for the deployment of information and reservation services have been formulated and analysed.

Option I. is the “do-nothing” scenario. It does not eliminate the inefficient use of truck parking capacity. The trend is that the situation will worsen. All further options have a positive impact as compared to this baseline.

Options II. to VII. foresee the voluntary or mandatory deployment of information and reservation services by means of European specifications. The main conclusions of the analysis are:

- The impacts are strongly related to the mandatory character of the deployment. Voluntary deployment yields small impacts only.
- The most positive impacts related to road safety, and to the working conditions of drivers. This benefits, consequently, the public authorities and the drivers. The economic impacts are positive and benefit mainly the hauliers. There are positive impacts for the environment.
- The benefits are small or nil for further stakeholders (TPA operators, cargo owners, insurers). The most critical situation concerns the TPA operators, because his co-operation is critical for collecting data and for handling reservations.
- The pairwise comparison of the respective with and without reservation (III./VI. and V./VII.) shows that once dynamic information is effective in a priority zone, the additional benefit of reservation services is not obvious for all parking operators and all hauliers.
- Extensive static information and dynamic information in priority zones is cost-effective. For reservation services, the evidence for assessing cost-effectiveness is insufficient.

Options V. and VII. result as preferable options.

Option V., which is characterised by mandatory extensive deployment of static information and mandatory selective deployment of dynamic information, can be seen as a necessary intermediate step towards Option VII.

Option VII includes voluntary deployment of reservation services in addition to what is in Option V. Considering on one hand, the present variety of different reservation service concepts and the still early status of development of standards for reservation transactions, and on the other

hand, the need to ensure consistency between dynamic information and reservation, it is recommended to prefer Option V in a first step.

The analysis of trade-offs and synergies yield the following recommendations:

- The deployment of static information should be extended to all TPAs that serve the truck traffic on the TERN. The scope should include specialised truck parking areas as well as multi-purpose areas that offer truck parking as a function among others
- The selection of priority zones for the deployment of dynamic information should search synergy with other ITS traffic management measures.
- The specifications for reservation services should leave room for a wide range of needs and situations: on-trip bookings as well as pre-trip bookings.

The assessment of special impacts yields the following hints for eventually optimising the specifications:

- Make sure that reservation services benefit to drivers as much as to their employers, by minimising the hassle of transactions and the additional constraints for drivers (options V. and VII.).
- Include requirements on reliability of dynamic data and on rules for proceeding in case of malfunction.
- Include harmonised rules for cancellations and penalties for no-shows (options VI. and VII.).
- Adopt simple criteria for the identification of priority zones where the implementation of dynamic information is mandatory (options V. and VII.).
- Scope the specifications on reservation services in a way that grants optimal cost-effectiveness. Further study might be required.

For optimal compliance with the principles set out in the ITS Directive, the specifications may eventually be enhanced by:

- Ensuring that adjacent Member States concerned by ITS parking priority zones located along cross-border transport corridors exchange information on their deployment plans for dynamic information services, and are encouraged to cooperate for an optimal continuity of service.
- Ensuring sufficient flexibility or time lapses for allowing existing legacy systems to be renewed in accordance with their own lifecycle.

- Ensuring that a single standard for handling reservation requests is prescribed, in order to prevent the risk of diverging developments.
- Considering the vicinity of important intermodal terminals among the criteria for identifying priority zones for ITS parking.

This risk assessment yields the following hints for eventually optimising the specifications:

- For static data, the specifications should make sure that all TPA operators are effectively pushed to comply with the obligation of declaration and with the data quality requirements.
- For dynamic data, the pattern of risks is such that a combination of scarce funds and of conflicting priorities between concerned actors can easily stall a deployment initiative in any priority zone. In order to prevent this situation, it might be opportune to include in the specifications not only a clear assignment of the obligation of results to one type of actor (e.g. the Member States), but also a default split of costs.
- For reservation services, in order to abate the risks, the specifications should ensure that dynamic information and reservation services follow consistent objectives in priority zones, and that TPA operators have the greatest possible freedom when it comes to handling the reservations on-site (e.g. choice of automatic and manual means, implementation on specialised truck parking areas as well as on areas for mixed public, …).

The effective accessibility and re-use of TPA data for service providers is a necessary requirement for successful deployment of services. While it may be opportune for different reasons to subject such data to a fee, it is the Member States' responsibility to ensure equal access for all service providers.

A set of ex-post monitoring indicators for evaluating the long-term effect of the specifications is proposed. It is recommended:

- To use all or only a selection of the indicators, depending on what aspects are considered most relevant, and also on available inputs in order to ensure a sufficient representativeness for the analysis.
- To allocate the collection of the indicators, depending on the means to be used, partly to the Member States, who should provide the results in the general framework of their reporting related to the ITS Action Plan, and partly to the European Commission.

- To aggregate the indicators in EC-wide progress reports, in accordance with the general monitoring requirements related to the implementation of the ITS Action Plan.

Appendix A : List of sources

- BMVBS (2012): Information about safe and secure truck parking, presentation to DG MOVE
- Council of the European Union, Interinstitutional File 2011/0294 (COD), Proposal for a Regulation of the European Parliament and of the Council on Union guidelines for the development of the Trans-European Transport Network
- DfT (2009) Strategy for Lorry Parking Provision in England
- DfT (2011) Lorry Parking Audit Study – Demand Analysis
- DG MOVE (2011) Commission Staff Working Paper, Impact Assessment on measures enhancing the effectiveness and efficiency of the tachograph system (Revision of Council Regulation (EEC) No 3821/85).
- DG MOVE (2012) Roadmap, Provision of information and reservation services for safe and secure parking for trucks and commercial vehicles (internal document)
- EasyWay FLS (2012) Intelligent Truck Parking and Secure Truck Parking, Deployment Guideline
- ECMT (2002), Crime in Road Freight Transport, OECD Publications Service
- Europol (2009): Cargo Theft Report
- EWTC II (2011) Truck Parking Strategy for the East West Transport Corridor - WP6D Truck Stops with ITS (Activity 1).
- EWTC II (2012) Truck Parking Strategy for the East West Transport Corridor - WP3C Information Broker System Final Report
- IRU (2007) Attacks on Drivers of International Heavy Goods Vehicles - Facts and Figures, International Road Transport Union
- ITS AP Study 3.5 “Study regarding secure parking places for trucks and commercial vehicles, telematics-controlled parking and reservation systems”, Deliverable D31 Final Report (2011)
- ITS AP Study 3.5 “Study regarding secure parking places for trucks and commercial vehicles, telematics-controlled parking and reservation systems”, Deliverable D5E Feasible Business Model for Information/Reservation System (2011)
- ITS National Report Italy, “Report on national activities and projects regarding the priority sectors – Italy’s Contribution”, September 2011
- LABEL (2011) Security and Service at Truck Parking Areas along the Trans European Road Network – Handbook for Labelling
- NEA (2007): Study on feasibility of organizing a network of secured parking areas for road transport operators on the TERN (final report; country studies)

- OCLDI (Office central de lutte contre la délinquance itinérante, 2007-2010): Fiches thématiques
- Swiss Federal Office for Spatial Development ARE (2012): Fair and efficient - The Distance-related Heavy Vehicle Fee (HVF) in Switzerland
- TruckPol annual reports (2007 – 2010, + 2011 quarterly reports)

Specific bibliography on monitoring and evaluation:

- DG ENTR (2006) - “Best report on the use of indicators in the monitoring and evaluation of sme-related actions” - Final report of the expert group
- DG MOVE (2008) - Impact assessment SEC(2008) 3083 - Accompanying document to the proposal for a directive of the European parliament and of the Council.
- DG REGIO (2006)- The New Programming Period, 2007-2013: Methodological Working Papers - INDICATORS FOR MONITORING AND EVALUATION: A PRACTICAL GUIDE

Appendix B : SWOT table for Data Coding Standards

	RDS-TMC	DATEX II part 6	TPEG-PKI	TARV-19
Strengths	TMC provides a proven method of compact language-independent coding of traffic information.	DATEX-II is a proven data coding standard for ITS applications. The Parking Extension builds on the framework developed for DATEX-II. It is in the early stages of the standardisation process.	TPEG is a proven data coding standard for ITS applications, geared towards efficient delivery to the end-user. The PKI Extension builds on the framework developed for TPEG. It is in the process of being accepted as a standard.	The only protocol currently available to process reservation requests.
		The extension's ParkingFacilityTablePublication allows detailed description of the static attributes of the TPA as well as groups of, or individual parking spaces.	TPEG allows for the detailed description of the carpark; type, name, operator name and logo, contact details, opening hours, maximum parking duration, pricing, fees and payment methods, surveillance, and any additional information in different formats (text, image, video).	
		Building on the powerful location coding framework of DATEX-II, the location, entrances and exits can be coded in sufficient detail.	Besides dynamic occupancy, waiting time, and reserved spaces per parking space type, general info on reservation services can be coded.	

	RDS-TMC	DATEX II part 6	TPEG-PKI	TARV-19
Weak-nesses	The possible level of detail is low, e.g. it is not possible to indicate information relevant to truck drivers, such as information on facilities, fees and payment methods, vehicle and cargo restrictions, entries and exits, opening hours, and the coding of the LABEL comfort and security rating.	Not all information relevant to truck drivers can be coded, such as the LABEL comfort and security rating. Only basic information on the expected occupancy rates can be provided.	Not all information relevant to truck drivers can be coded, such as the LABEL comfort and security rating. Only basic information on the expected occupancy rates can be provided.	Technological maturity is low and suitability will first need to be ascertained in field tests.
	Technically speaking detailed TPA topology could be coded in the TMC location table, but this would mean updating a large set of existing TMC location tables, or the definition of a table specifically for EU truck parkings. The first approach is a long process relying on many actors and taking several years to complete. It is likely to be impossible in larger MS because of restriction on the number of TMC locations. The second approach would require establishing a complete new TMC network for the EU, and further hamper integration of the information in fleet management and navigation systems. Both options are not suited.	DATEX-II was not designed for efficient delivery to end-users, but to exchange detailed information between the key players in the value chain.		

	RDS-TMC	DATEX II part 6	TPEG-PKI	TARV-19
Oppor-tunities	TMC provides a proven method of language-independent coding of traffic information. Many TMC services exist so the risks and costs of deployment of new truck parking services based on TMC would be relatively low.	The DATEX-II Parking Extension allows coding of detailed information on location, facilities and occupancy of truck parking areas, based on a reliable framework.	TPEG-PKI allows coding of detailed information on location, facilities and occupancy of truck parking areas, based on a reliable framework, and provides efficient compact and secure coding for delivery to end-users.	Builds on CALM which is likely to become the dominant set of standards for cooperative systems
Threats	The bandwidth and location coding restrictions of TMC pose strict constraints on the functionality that can be provided to truck drivers.	DATEX-II is not the obvious choice for delivery to the end-user, as the coding result is not compact.	Road authorities are likely to become the most important source of truck parking information. They are accustomed to using DATEX rather than TPEG.	Is embedded in CALM, a complex set of new protocols for cooperative systems. Deployment of part 19 requires deployment of many other CALM protocols making deployment complex

Appendix C : SWOT table for Distribution Channels

	Strengths	Weaknesses	Opportunities	Threats
Road side VMS	VMS have a precise location on the road network, allowing conveyance of relevant information to all passing truck drivers	The short time window to convey the information to truck drivers, and the fact that multilingualism can only be achieved by using graphs, means that VMS can only transmit a very limited amount of information	For very busy corridors with a high parking pressure, VMS can reach truck drivers that cannot be reached through other channels	The implementation and operational costs of VMS are very high
SMS/MMS services	Good network coverage and large installed base	The limited bandwidth poses severe restrictions on the service's functionality. Roaming costs for the user.	Mobile phones have near 100% penetration amongst truck drivers and GSM networks provide nearly 100% coverage in the EU	Services on this channel are likely to encourage texting while driving unless an appropriate HMI application is installed in the vehicle
Voice response systems	Good network coverage and large installed base	The limited bandwidth and omission of push-mechanism poses severe restrictions on the service's functionality. Roaming costs for the user.	Mobile phones have near 100% penetration amongst truck drivers and GSM networks provide nearly 100% coverage in the EU	Services on this channel are likely to encourage mobile phone use while driving unless an appropriate HMI application is installed in the vehicle
RDS/TMC data casting	Multilingual delivery, proven technology, moderately large installed base	Very limited bandwidth and no backlink	TMC can be implemented on radio networks in less equipped Member States	The analogue signal is likely to be replaced by DAB in some Member States in the coming decade

	Strengths	Weaknesses	Opportunities	Threats
Truck radio station	Captive medium familiar to truck drivers	No multilingual support, very limited bandwidth, no backlink	Large installed base of devices and extensive coverage of infrastructure	The analogue signal is likely to be replaced by DAB in some Member States in the coming decade
DAB/ TPEG data casting	Multilingual delivery, large bandwidth, proven technology, TPA information can be described in detail	DAB provides no backlink	The analogue signal is likely to be replaced by DAB in some Member States in the coming decade	The transition from analogue radio to DAB is slow, and depends mainly on the business case of spoken radio. EU-wide coverage is unlikely to materialise in the coming decade.
DVB-H TV channel	Powerful medium to transmit information	Very limited bandwidth, not multi lingual, and no backlink	Deployment of DVB-H could become widespread based on business cases from the entertainment industry	In-cabin TV is likely to cause driver distraction
DVB-S/ TPEG data casting	Multilingual delivery, large bandwidth, proven technology, TPA information can be described in detail	Costly operation, no backlink	With one service a very large area of the EU can be covered.	The installed base is very low. It is unlikely that truck drivers will be inclined to buy yet another device.
DVB-SH data communi-cation	Multilingual delivery, large bandwidth, proven technology, TPA information can be described in detail, backlink available	Costly operation for the satellite channel	With one service a very large area of the EU can be covered.	The installed base is very low. It is unlikely that truck drivers will be inclined to buy yet another device.

	Strengths	Weaknesses	Opportunities	Threats
Mobile internet	Multilingual delivery, large bandwidth, proven technology, TPA information can be described in detail using multiple protocols, backlink available, large installed base	Costly operation for the terrestrial radio channel, data roaming costs can lead to serious costs for the truck driver	With one service a very large area of the EU can be covered, but national services can also be defined. The technology is likely to be around for many more years as LTE will be introduced in the coming years in many Member States	Data roaming costs may hamper cross-border use. Poorly designed smartphone apps may cause driver distraction.
Electronic informa-tion booths	Multilingual, transmits information without causing driver distraction, information can be presented in text, speech, maps, and graphs	Cannot be used in cabin	For very busy corridors with a high parking pressure, this can provide solutions to very specific problems; e.g. helping truck driver with routing through urban areas.	The implementation and operational costs are very high

Appendix D : Accident Descriptions

The present appendix contains the summary description of the 12 accidents involving parked trucks that are documented in the ETAC database, as referred to in section 4.1.2.

HI049 - “Loaded trucks were waiting in a line on an industrial road in front of the factory to unload the cargo. Behind of trucks came a trailered truck which braked too late and crashed into the last lorry in the row.” Material damages only.

HI068 - “Vh1 manoeuvred with his car at a car park and because of the hazy window, he crashed into a truck parked there without driver. The car driver was slightly injured in the accident and both vehicles got minor damages. A little piece broke out from the right of the bumper of the truck. The driver of the car informed the doorman of the nearby works about the damages and left the scene. Then the truck burst into flames, but the firemen came and slaked the fire.”

HI084 - “The truck with a semitrailer loaded with cargo was waiting in a parking place with running motor. The surface of the parking place was on a slope and the vehicle began to move forward. The driver wasn't in the cabin and he attempts to get in, running in front of the truck. But the left frontal side of the tractor pressed him to the rear side of the truck standing in front of his vehicle. The driver was dead on the scene. According to the opinion of the authorities the accident was caused by the fact that the handbrake was not in use.”

HI091 - “Driver "A" was parked with his truck in a parking area, when driver "B" on same parking area reversed his truck. Driver "B" didn't see the other truck parked and crashed the cabin of this parked truck, with his rear end.” Material damages only.

HI136 - “The driver was waiting with his truck on a side road when the moving truck with a trailer, in front of him, crashed to it during a reversing manoeuvre. There was a significant material damage in the accident.”

IP010 - “The accident takes place on Highway on a straight line. The vehicle (car 1) comes on the right-hand lane of highway. Maybe for a sudden sleep (fall-asleep), he skids towards the right and hits the left side of a truck. Truck driver is sleeping on his vehicle (beyond the emergency roadway). The vehicle (car 1) rolls over into the right slope of the highway. Owing to this roll over the driver is ejected from the vehicle (the safety belt was fastened) and he is hit by another vehicle which is coming.” The driver dies.

NT003 - “A truck driver is not paying attention to the traffic and drives against a parked truck.” Material damages only.

SI025 - “Front-to-rear collision between a car and a trailer. The car was exiting the highway and entering to a rest area when crashed against a truck parked in the rest area. The passenger car driver dies. The car under ran under the RUP (Rear Under run Protection) system of the trailer.”

SR003 - “Accident happened on the exit of a main highway into a rest area. It was early in the morning and outside was still dark. The road surface was dampish but not slippery. A smaller truck drove on this exit driving lane towards the rest area. Suddenly he crashed into the back side of the semi-trailer, which was parked on the left side of the driving lane. The heavy truck with semi-trailer parked on the driving lane did not have parking lights on. The front left side of the truck crashed into the right back side of the parked semi-trailer. After the crash the smaller truck wedged in the semi-trailer and its driver dies.”

SR059 - “Accident happened on the straight and rising section of the highway. It was early in the morning and outside was still dark. The road surface was dry. The carriageway had three parallel driving lanes. A passenger car was driving on the left side of the right driving lane. Suddenly he crashed into the back side of the semi-trailer that was stopped on the right side of the same driving lane. Heavy truck with semi-trailer not even had parking lights on. Front side of the passenger car crashed into the left back side of the semi-trailer. After the crash passenger car bounced left over two driving lanes on the left side of the carriageway where crashed into the metal guard rail. The passenger car driver dies. »

SR064 - “The truck driver stopped the truck and semi-trailer on the road, because there was a line of trucks in front of him. He left the truck to arrange some papers in a near-by building. Other trucks stopped behind his truck, but at the time of the accident his truck was the last in the row. A car driving on the same road in the same direction crashed into the back of the truck’s semi-trailer. The passenger of the car was slightly injured.”

SR130 - “Accident happened during the night on local road. Driving directions on this local road were not separated with painting marks. The road surface was dry and it was still dark. A passenger car drove from the town center. In a sharp left curve the passenger car began to slide laterally and rotate. On the straight section of the road, behind the sharp left curve, there was on the right side of the road a stopped heavy truck with semitrailer. The passenger car driver having lost control of his vehicle in this curve crashed into the parked semitrailer. The right side of the passenger car hit the back side of the parked semitrailer. The passenger car driver was slightly injured.”

Appendix E : Compilation of Reports on Economic Loss

See separate document

Appendix F : Detailed Assessment of Economic, Social/ Safety and Environmental Impacts

See separate document

Appendix G : Detailed Assessment of Impacts on Stakeholders

See separate document

Appendix H : Analysis of Impact on Existing Markets and Services

The present appendix contains the analysis of the market evolution induced by each deployment option, as referred to in section 6.3.

Option I. Baseline scenario

The problems that are presently observed persist. Existing s+sTPA capacity remains unused at some places, while some other parking areas are overcrowded at specific peak times. Situations of overcrowding lead to dangerous parking or drivers breaking resting time rules. The trend is that the situation will worsen because the shortage of parking lots cannot be addressed fast enough in Member States' investment plans, while road traffic grows quickly.

Existing databases on s+sTPA continue to be operated with variable scope and on an unstable financial basis. Some might be stopped. Implementations of dynamic information are legacy systems plus isolated flagship operations in specific, opportunistic situations. Wide coverage is not expected. Reservation services for s+sTPA continue to exist only in particular situations.

The functional, organisational and technical features of existing services continue to be heterogeneous. The Easyway guidelines support new implementation projects but do not effectively harmonise. The standards Datex II and TPEG are implemented in a limited number of situations where different authorities agree on data interchange.

Reservation services exist for isolated s+sTPA where they meet specific demands.

The demand for ITS is identified but not reflected in market demand (no willingness to pay for information and reservation services for s+sTPA).

No significant reduction of vehicle kilometres and unsafe parking behaviour can be observed.

Option II.
Specifications for voluntary deployment of static database

The specifications harmonise existing databases and ongoing efforts of data collection driven by Member States. Some MS will take organisational

provisions for a national public database; others will conclude agreements with third-party database operators for managing the static data of publicly operated s+sTPA. In this way, a limited number of databases will cover most s+sTPAs, with little content overlap between them.

Where the cooperation between database operator and TPA operator is good, management of data quality is improved thanks to the specifications. In some cases, database content may reduce due to lack of a business case for the TPA operator, depending on the terms proposed by the database operator.

Service providers become increasingly interested in the data because quality improves and data formats are harmonised. Access to data is ruled by bilateral agreements between service providers and database operators.

Some MS implement a public website for access to national databases.

In the whole picture, information on available s+sTPA remains patchy. In MS which do not create a national database, it remains unreliable beyond existing databases on s+sTPA, comparable to the scenario where the EU is not intervening.

Beyond the continued operation of legacy systems, the uptake of dynamic ITS to effectively distribute excess demand across all available TPA is minor. Reservation services exist in specific situations.

No significant reduction of vehicle kilometres and unsafe parking behaviour can be observed.

Option III.
Specifications for voluntary deployment of static database, including provisions for dissemination through service providers, and for voluntary deployment of dynamic ITS

The collection of static data develops as in Option II. While the coverage remains patchy in the whole picture, the integration of static TPA data in navigation and fleet management services is accelerated and effectively perceived by drivers and hauliers thanks to a common look and feel of the services.

Initiatives by Member States or road operators for deploying dynamic information services are eased by the specifications, and the uptake is

accelerated. Reservation services continue to exist in specific situations only, or as proof-of-concept.

Drivers and hauliers start to systematically use the information on s+sTPA in specific situations. The increase of unsafe parking behaviour is halted. A significant quantitative reduction of kilometres and time for parking cannot be observed yet.

Option IV.
Specifications for mandatory deployment of static database with the Dissemination to end users is left to Member States

Static data on s+sTPA become systematically available, and data quality improves. Some MS implement a national database, while others rely on third-party database operators who aggregate the data of several MS on the basis of appropriate agreements. It is probable that these databases will use and further develop, by means of various agreements between the concerned parties, the present attempts to create and maintain national and international static databases on s+sTPA.

Service providers incorporate the information into multiple websites and smartphone applications, and into the leading products for navigation and fleet management. In particular, some products will integrate the static TPA data with dynamic data on remaining driving time extracted from future tachographs. Most MS implement an official website for their territory.

Drivers and hauliers use the information for pre- and on-trip planning. The missing link to current occupancy information reduces the perceived benefit of the standardised information. There is a quickly growing need for managing situations of overcrowding. But the deployment of dynamic information services remains quite slow due to the difficulty of such initiatives for Member States and road authorities.

Reservation services continue on commercial level in specific situations only, or as experimental developments on selected corridors.

The increase of unsafe parking behaviour is halted. A significant quantitative reduction of kilometres and time for parking cannot be observed yet.

Option V.
Specifications for Mandatory Deployment of Static Database, Including Provisions for Dissemination, and for Voluntary Deployment of Dynamic ITS at Specific Locations

Static information services develop similarly to Option IV.

Dynamic information will continue based on legacy systems in a first period. The legacy systems will be integrated in wider dynamic implementations when their lifecycle allows it. New implementations will develop according to the organisational and financial solutions adopted by the Member States for each ITS parking priority zone.

Technical solutions for dynamic data collection will become more mature, and market prices will stabilise.

Access to dynamic data for service providers will generalise slowly, when TPA operators have sufficient experience for anticipating the effect of dynamic information on occupancy.

Once in place, dynamic information on ITS parking priority zones will strongly improve situations of overcrowding and inefficient distribution in the concerned corridors. A number of dangerous situations will be eliminated. Traffic management and haulage operations become more efficient in peak times, and a reduction of kilometres and time for parking will be observable on the concerned priority zones.

Option VI.
Specifications for voluntary deployment of static database, including provisions for dissemination through service providers (Option III.) + functional specifications for reservation services

The developments of static and dynamic information services are as in Option III.

Reservation services will develop experimentally on selected locations and corridors, with diverse commercial approaches. The prescribed technical standards and associated business rules will be adopted.

Private TPA operators in Priority zones experiment the effect of dynamic information as well as of reservation. Around some Priority Zones reservation of parking lots becomes possible where the demand is in excess of supply and a business case allows for exploitation of the

willingness to pay of users. In the whole picture, commercial reservation services and authority-handed dynamic truck parking management develop in parallel, without clear relation.

The overall coverage of the network for reservation remains scarce. There is no central database for reservation services. Reservation services progressively generalise in TPAs with parking fees, and the use of reservation becomes routine practice for certain segments of transport that reach efficiency gains and protection from theft and robbery. However, reserving and paying truck parking remains a minority practice among the hauliers and drivers, and contributes only little to the reduction of accidents related to offsite parking and exceeding driving times.

Overall the addition of reservation services will support the search of a parking lot only in Priority Zones and will be used only by a limited user group. Increasing demand of drivers transporting high value or hazardous goods might help to support the uptake around high demand areas but no significant effects occur beyond this very limited scope.

Option VII.
Specifications for Mandatory Deployment of Static Database, Including Provisions for Dissemination, and for Voluntary Deployment of Dynamic ITS at Specific Locations (Option V.) + functional specifications for reservation services

The implementation of dynamic information services in ITS Parking Priority Zones takes into account the needs of reservation services; also TPA operators are free to adopt the specifications without MS action.

Reservation services will work in combination with the supply of dynamic occupancy data and in Priority Zones, where capacity management is most critical. Expansion of reservation services advances slowly but steadily.

The effects of option VII. are similar to option V. but allow high value or hazardous good transports to reserve a parking place in the most relevant Priority Zones. This demand might not constitute a viable business case in all TPAs of these areas, but reservation services subsidised by the MS are contributing to the safety of those transports.

Complementary observations:

- Information and reservation services for s+s truck parking are a minor application in the wider context of the market of communication channels between vehicles and central services (cellular networks, satellite communication channels, etc.), and of the market for mobile or in-vehicle devices (smartphones, tachographs, tolling OBUs, …). They will adapt to the big trends on these markets, without influencing them significantly.

- Dynamic information in ITS parking priority zones may influence the present competition between the TPA operators in the concerned zone, because equilibrating the demand leads to unequal occupancy improvement among the concerned TPA operators.

Appendix I : Analysis of Special Impacts

The present appendix contains the analysis of the deployment options with regard to a list of special impacts, as referred to in section 6.4.

FUNDAMENTAL RIGHTS

Impacts are evaluated against the baseline scenario. Impacts apply if a TPA ITS service is implemented. Options are therefore differentiated by the provided type of service.

Relevant fundamental rights that have to be considered in the assessment include:

- Protection of personal data
- Fair and just working conditions (see below: number and quality of jobs)
- Environmental protection

The remaining fundamental rights (cf. EC Annexes to impact assessment guidelines 2009, p.29-30) are presumably unaffected by the implementation of an ITS service for truck parking. Effects on fundamental rights are displayed in the table below according to level of service of the envisioned ITS. The effects apply to all for the study considered technologies and data formats.

Possible effects on fundamental rights	Static data	Dynamic data	Reservation service
Protection of personal data	No personal data is handled, no exchange	Precautions have to be taken to prevent exposure of personal data upon data exchange (data requests, payment for services) and possible storage	Reservation interface has to comply with data protection laws, all exchanged data (identification, requests of personal data, payment information) have to carefully used and stored
Environmental protection	Minor environmental benefits through more efficient use of parking, less km driven in the process (less pollution, energy use)	See *static data*, but even slightly higher effects due to more efficient and possible flexible adjustments	See *static data*, but even higher effects due to more reliable planning

The table shows that data protection needs to be monitored as soon as it comes to personalised dynamic information requests and to reservations. Existing regulations apply, and are sufficient to warrant the protection of personal data.

NUMBER AND QUALITY OF JOBS

The supply of qualified truck drivers in the transport sector is considered as a current bottleneck for continuous and reliable service. The dignity and welfare of truck drivers associated with their working conditions can be identified as a major source of this problem[2021]. This can partly be accounted to the strict working time rules, which are in combination with time pressure for deliveries a stressful component. Overcrowded parking areas lead to offsite parking to comply with the time rules, which leads in turn to limited dignity having to stop overnight without appropriate facilities.

An improvement of working conditions can therefore also improve the quality of the jobs and can consequently be considered as a relief to recruitment problems, which are seen as structural problem of the sector over a long term[22]. The main factors of ITS services for truck parking that benefit the drivers are:

Possible effects on number and quality of jobs	**Static data**	**Dynamic data**	**Reservation service**
Fair and just working conditions	• General availability of desired level of service can be assessed and rest stops can be planned ahead • Pressure to find parking reduced because location of rest stops is easier and earlier accessible • Compliance with driving time rules and required rest stops can be improved	See *static data*, but even slightly higher effects due to more efficient and possible flexible adjustments	See *static data*, but even higher effects due to more reliable planning

[20] European Agency for Safety and Health at Work, Occupational Safety and Health in the Transport Sector – An Overview, 2011

[21] Report of the High Level Group on the Development of the EU Road Haulage Market, June 2012

[22] Report of the High Level Group on the Development of the EU Road Haulage Market, June 2012

	• Information for foreign drivers is more easily accessible		

The assessment of the impact on quality of jobs overlaps with the assessment of the impact on the drivers as a stakeholder category (see 6.2). It is said there that the additional benefit of reservation services is not obvious once dynamic information is mandatorily deployed in priority zones. From the point of view of the driver job, it is important that the gain of reliability through booking benefits not only to the company but also to the individual driver.

The recent report of the European Agency for Safety and Health at Work discusses the general trend of technology applications in road transport. According to this report, drivers acknowledge that such applications provide advantages such as increased safety, correct and equal treatment of all drivers, time gains; but there is also uneasiness, confusion and irritation amongst the drivers, who do not know exactly what is logged by the computer and if the data are used to calculate wages. In addition, lorry drivers have to learn how to operate these applications — not necessarily a simple task, which may lead to extra stress.[23]

Therefore, with regard to the working conditions of drivers, the benefit of information and reservation services *alone* should not be overestimated. Working conditions will more directly benefit from capacity increase of s+sTPA than from more efficient use of existing s+sTPA.

INDIRECT IMPACTS ON END-USERS AND HOUSEHOLDS

Prices for transported products (for consumers) are unlikely to be affected by the implementation of the ITS services, since the cost for hauliers of using information and reservation services for safe and secure parking is small[24]. Moreover, the ITS services lead to efficiency gains that reduce costs that can be passed on to consumers.

Even if a premium for using ITS services for safe and secure parking would systematically be passed on to the shippers, the impact on consumer prices would be very small. Indeed, experience with distance-

[23] European Agency for Safety and Health at Work, op.cit., p.133-134.

[24] Orders of magnitude :
3 € for a s+sTPA reservation transaction,
15 € for an overnight rest in a s+sTPA,
45 € for distance-related HGV toll on a 300 km stretch.

related HGV pricing schemes, which cause much higher costs to hauliers than ITS for safe and secure parking, shows that impact on consumer prices is very small[25].

LIABILITY

Issues may arise due to possible distraction of drivers handling poorly designed devices to access information on parking while driving. Comparable applications with rules and fines for violations are in place (cf. use of mobile phones while driving).

Issues may arise with the collection method of dynamic data. Faulty collection might lead to misinformation, eventually entailing economic prejudice for TPA operators or hauliers. Reliability of data needs to be ensured, and proceedings for malfunctions and consequences need to be defined.

INAPPROPRIATE USE

Operators of s+sTPA might be affected by misuse of reservation services. Harmonised measures for cancellations and penalties for no-shows should be applied.

COST EFFECTIVENESS

Cost effectiveness means that the same benefit could not be reached at less cost through other measures.

Concerning static information, the stakeholder consultation has shown that it is the basis for any further information and reservation service, and that the costs are deemed relatively low and acceptable for the concerned stakeholders[26].

Concerning dynamic information, experience shows that occupancy gains for existing s+sTPA can be reached by implementing dynamic information services[27]. However, the empirical evidence cannot readily be extrapolated to the European scale because it is fragmentary and dependent on the

[25] Swiss Federal Office for Spatial Development ARE (2012): Fair and efficient - The Distance-related Heavy Vehicle Fee (HVF) in Switzerland, p.19.

[26] See Deliverable D2, page 61.

[27] See Deliverable D2, page 48, for the example of French motorway A10.

specific configurations of offer and demand and of the infrastructures in each case.

We estimate on the basis of section 4.3 that equipping an existing s+sTPA with a system for collecting and providing dynamic information amounts to 150 k€. This figure is quite independent from the size of the TPA. In relation to the costs of building a new s+sTPA, the equipment for dynamic information represents an extra cost of about 10 to 30 %. This means that dynamic information is cost effective if it diminishes the need for extra new infrastructure by 10 to 30%. This reduction is in the same order of magnitude as the occupancy gains that have been reached through dynamic information in the vicinity of parking priority zones.

The stakeholder consultation, while it has underlined the need of hard capacity increase of s+s truck parking infrastructure, has expressed a strong support for dynamic information and reservation services. It has not identified any alternatives to information and reservation services when it comes to optimising the use of existing (and future new) infrastructure.

Concerning reservation services, the available evidence is insufficient for assessing cost effectiveness.

Hence, cost effectiveness is given for extensive static information and for dynamic information in priority zones. There is insufficient evidence for assessing cost effectiveness of reservation services.

ADMINISTRATIVE BURDEN

The scope of administrative burden assessed here does not include the role of public authorities in implementing and operating information and reservation services for s+sTPA. This impact is taken into account in sections 6.1 and 6.2.

Administrative burden arises for Options II. to VII. for the definition and management of responsibilities on MS level. This is regarding:

- Static data (Options II. to VII.)
- Dynamic data (Options II. to VII.). The burden is increased in Options V. and VII. due to the mandatory nature of dynamic information in priority zones; indeed, the priority zones have to be identified according to the criteria defined in the specifications in a preliminary step.
- Reservation service (Options VI. and VII.).

IMPACTS ON THIRD COUNTRIES

Third, non-EU, countries are not negatively affected by the implementation of the ITS service. Using the services will not be restricted to EU member drivers and accessibility to the service can be acquired at the same costs for all drivers.

Conditions for third countries	**Static data**	**Dynamic data**	**Reservation service**
Access to the service	Access is unrestricted	General access is unrestricted, payment services might be limited to EU members	General access is unrestricted, payment services might be limited to EU members
Use of service	Possible language barrier if non EU language, for some information	Possible language barrier if non EU language, for some services	Possible language barrier if non EU language, for some services

Impacts on third countries	**Static data**	**Dynamic data**	**Reservation service**
Benefits of service	• Increased efficiency in transport applies only to partaking countries • Employment conditions in partaking countries benefit	• Increased efficiency in transport applies only to partaking countries • Employment conditions in partaking countries benefit	• Increased efficiency in transport applies only to partaking countries • Employment conditions in partaking countries benefit

Appendix J : Assessment of Compliance with the Principles Set Out in the ITS Directive

The present appendix contains the assessment of the deployment options with regard to the principles set out in Annex II of Directive 2010/40/EU, as referred to in section 6.5.

(a) **Be effective –** make a tangible contribution towards solving the key challenges affecting road transportation in Europe (e.g. reducing congestion, lowering of emissions, improving energy efficiency, attaining higher levels of safety and security including vulnerable road users).

The core objective of optimising the use of existing parking capacity will contribute to the objectives of increasing road safety and security of transport and the welfare of drivers, and minimizing the environmental impact of road transport (see section 0).

The impact of each deployment option with regard to these objectives is shown in section 6.1.

(b) **Be cost-efficient –** optimise the ratio of costs in relation to output with regard to meeting objectives.

The cost effectiveness is assessed in section 0. Cost effectiveness is optimal for extensive static information and for dynamic information in priority zones, as defined in the deployment options. For reservation services, further study might be required for scoping the specifications in a way that grants optimal cost-effectiveness.

(c) **Be proportionate –** provide, where appropriate, for different levels of achievable service quality and deployment, taking into account the local, regional, national and European specificities.

The deployment options clearly distinguish the service types of static information, dynamic information, and reservation, the spatial scope of deployment of each service (namely, the priority zones for dynamic information), as well as the voluntary or mandatory character of the specifications for each type of service. By doing so, they ensure an appropriate compromise between homogeneity (namely, static information must be extensive on the TERN), and selective deployment depending on

the characteristics of specific transport corridors, highways or peri-urban zones.

(d) **Support continuity of services –** ensure seamless services across the Union, in particular on the trans-European network, and where possible at its external borders, when ITS services are deployed. Continuity of services should be ensured at a level adapted to the characteristics of the transport networks linking countries with countries and where appropriate, regions with regions and cities with rural areas.

For static information, the deployment options with mandatory deployment (options IV. to VII.) ensure full continuity of service.

For dynamic information, the issue of continuity arises where parking priority zones are located on cross-border transport corridors. In this case, the specifications should ensure that the concerned Member States exchange information on their deployment plans and are encouraged to cooperate for an optimal continuity of service.

For reservation services, continuity will depend on the scope of the specifications.

(e) **Deliver interoperability –** ensure that systems and the underlying business processes have the capacity to exchange data and to share information and knowledge to enable effective ITS service delivery.

The specifications will ensure full interoperability through the definition of data coding formats based on well-accepted standards. Legacy systems can be made compliant with the standards. There isn't any prescription of the technology used for data collection, since this is not necessary for interoperability.

(f) **Support backward compatibility –** ensure, where appropriate, the capability for ITS systems to work with existing systems that share a common purpose, without hindering the development of new technologies.

For data exchange, legacy systems can be made compliant with the standards. The integration of legacy systems for dissemination, into shared systems, of VMS in particular, will be an issue when it comes to deploying dynamic information in priority zones. The specifications should ensure sufficient flexibility or time lapses for allowing existing legacy systems to be renewed in accordance with their own lifecycle.

(g) **Respect existing national infrastructure and network characteristics –** take into account the inherent differences in the transport network characteristics, in particular in the sizes of the traffic volumes and in road weather conditions.

All options respect the existing parking infrastructure. The deployment of dynamic information respects the characteristics of the networks (see principle (c) above).

(h) **Promote equality of access –** do not impede or discriminate against access to ITS applications and services by vulnerable road users.

The ITS services for s+sTPA target professional drivers, which are not considered as vulnerable road users.

(i) **Support maturity –** demonstrate, after appropriate risk assessment, the robustness of innovative ITS systems, through a sufficient level of technical development and operational exploitation.

The risk assessment in section 6.6 indicates that technology is mature for static information, while there is a risk of slow market development for dynamic data collection systems, and a risk of non-emergence of a widely accepted standard for reservation services.

The specifications will give a push for the maturity of data collection systems market, which will be significant in case of mandatory deployment of dynamic information in priority zones (options V. and VII.).

For reservation services, specifications should ensure that a single standard for handling reservation requests is prescribed, in order to prevent the risk of diverging developments.

(j) **Deliver quality of timing and positioning –** use of satellite-based infrastructures, or any technology providing equivalent levels of precision for the purposes of ITS applications and services that require global, continuous, accurate and guaranteed timing and positioning services.

The deployment options are fully compatible with the use of satellite-based technology for timing and positioning, although they do not prescribe the technology to be used. It is expected that the ITS services for safe and secure truck parking will be strongly integrated with advanced fleet

management services that use GNSS positioning. Also, GNSS technology is currently being tested for the purpose of dynamic data collection on TPA occupancy.

(k) **Facilitate inter-modality –** take into account the coordination of various modes of transport, where appropriate, when deploying ITS.

Safe and secure truck parking is focussed on road transport. However, there are parking priority zones in the vicinity of important intermodal terminals (e.g. seaports), which often coincide with peri-urban zones. These zones are in the scope of the deployment options.

(l) **Respect coherence –** take into account existing Union rules, policies and activities which are relevant in the field of ITS, in particular in the field of standardisation.

All options will respect existing rules, policies and activities. The primary benefits of the implementation of s+sTPA ITS lie in the harmonisation and standardisation of available data. The prescribed data coding standards are coherent with ongoing technical developments in the transport sector.

For publishing static data on truck parking, Member States have the possibility to use the procedures and technical platforms that they have set up in the context of the INSPIRE directive.

Appendix K : Quantitative Estimation of Costs and Benefits

Estimate of Parking Demand

International road haulage in the EU amounts to 578 billion t.km per year[28].

The average distance in km covered by goods carried by hauliers from EU countries in bilateral international transport operations is 610 km[29]. The average load is 16 t[30]. Dividing the total performance by these factors, we estimate the number of trips to 60 million per year.

We assume that each of these trips gives rise, in average, to 1 event of parking, that is essentially generated by the need to comply with social regulation while driving on the high-level network. This assumption does not differentiate between short-duration breaks and long-duration rests.

Multiplying the number of trips with this coefficient, we estimate the number of events where a vehicle stops for parking during a long-distance trip on the high-level network to 60 million per year.

Estimate of Parking Supply

We assume that there are 5,000 truck parking areas for trucks along high-level roads in Europe, with an average capacity of 20 places for HGV[31]. This results in an assumed capacity of 100,000 places.

We assume that each place provides for 1 short-duration break and 1 long-duration rest per 24 hours on 300 days per year.

Multiplying these assumptions, we estimate the supply to 60 million parking slots per year.

These estimates are usefully compared to the model results obtained by NEA[32].

[28] EC, EU transport in figures, Statistical pocketbook 2012

[29] EC, Road Freight Transport Vademecum 2010 Report

[30] Vademecum

[31] Assumption extrapolated from estimates expressed at the stakeholder workshop, and from a count of rest areas by Asecap (www.asecap.com).

[32] NEA (2007): Study on feasibility of organizing a network of secured parking areas for road transport operators on the TERN.

NEA has modelled the demand and supply of secure parking in 2007. The demand is based on Origin Destination pairs for road freight transport in Europe in 2002, and the supply on data from IRU and ECMT.

Estimate of Benefits

The deployment of information and reservation services for s+sTPA will optimise a certain number of the parking events estimated above. The proportion of the optimisation will differ from deployment option to deployment option.

We consider three factors:

- The productivity gains (reduction of private cost) from reducing driving time and kilometres spent for search of parking. We estimate the productivity gain via the operating cost of a freight truck in Europe, assuming 60 € per hour by taking an average from figures of a study cited in a recent EC report[33].

- The reduction of external cost from reducing driving time and kilometres spent for search of parking. We assume an external cost of 0,20 € per km[34].

- The reduction of situations of dangerous offsite parking. We have estimated in section 4.1.4 of the present report that offsite parking of trucks amounts to 44 fatalities and 1,430 injuries per year in Europe. Assuming a social cost of 1,36 million € per fatality and 42,500 € per injury[35], this translates to a monetary value of 120 million €.

The model results in a supply of 111 529 places and a demand of 127 043 places. The supply figure is comparable to our estimate. The demand figure is somewhat higher and reflects the overall situation of scarcity. It incorporates a factor of 1.3 for taking into account the peak demand situations. By the way, scarcity is amplified if forecast demand data for 2020 is considered.

Hence, while the results are comparable, the NEA model represents a far more elaborated approach, and is capable of analysing the distribution of supply and demand in terms of geography, goods types and parking security classes.

However, the NEA model depends on similar assumptions and approximations regarding the number of stops generated by a long-distance trip, the distinction between long-distance haulage and all other occupants of truck parking areas, and regarding to which parking areas, in terms of size and characteristics, are taken into account. These assumptions and approximations limit the accuracy of the results.

[33] Report of the High Level Group on the Development of the EU Road Haulage Market, June 2012

[34] Rough assumption comprising external costs for noise, congestion, accidents, air pollution, climate change in interurban transport, based on the range of values proposed by the IMPACT study for Germany. Most other studies focus on t.km and result in higher assumption when multiplied with an average load of 16 tons.

[35] Figures based on eCall impact assessment and on the proportions of severe and light injuries drawn from the CARE databse. See Impact assessment of priority action C for details.

Benefit of Deployment option IV. (mandatory deployment of static information):

We assume as impact:

- 5% of parking events gain 15 minutes of driving time each, meaning 20 km
- 20% of offsite parking situations are eliminated
- These assumptions apply to the horizon where deployment is completed.

With these assumptions, we estimate:

- 45 million € of productivity gains
- 12 million € of reduction of external cost
- 24 million € of reduction of external costs due to accidents due to offsite parking.

Benefit of Deployment option V. (IV. + mandatory deployment of local dynamic ITS):

We assume as impact:

- Additional 5% of parking events gain 15 minutes of driving time each, meaning 20 km,
- 40% of offsite parking situations are eliminated
- These assumptions apply to the horizon where deployment is completed.

With these assumptions, we estimate:

- 90 million € of productivity gains
- 24 million € of reduction of external cost
- 48 million € of reduction of external costs due to accidents due to offsite parking.

Estimate of Costs

Cost of Deployment option IV. (mandatory deployment of static information):

We estimate the costs incurred by TPA operators and public authorities for providing static data and implementing and managing a static database to 4 million € per year (EU-wide total)[36].

[36] The figure of max. 1000 €/year and TPA for data provision only, presented to the stakeholder workshop, was judged too high by the participants. The present estimate is equivalent to 800 €/year and TPA including the overhead for central database implementation and management (the cost of which is not incurred by TPA operators).

We do not estimate the service providers' cost for integrating the data into their services and devices, assuming that it will be relatively low and inseparable from general business development and production costs.

We do not estimate either what the users will pay for having access to services with static information on s+sTPA, assuming that these data will be integrated into other products (fleet management services and devices, navigation devices, tachographs, …) without being identifiable in the general product price.

Cost of Deployment option V. (IV. + mandatory deployment of local ITS):

We assume that 30 priority zones must be equipped, each one comprising in average 10 parking areas.

Based on section 4.3, we assume the overall cost of one priority zone to 2 million € of initial investment. This estimate represents a high end, since depending on the circumstances, existing equipment may be used.

Assuming yearly maintenance and operation cost to 10% of the initial investment, and depreciation over 10 years, total yearly cost in an income statement approach is 12 million € per year for 30 priority zones.

We estimate to 9 million € per year the expenditure of hauliers for products and services that provide dynamic information. This estimate is based on the following assumptions:

- only regular users spend for products and services
- the regular users make up for 50% of the estimated demand (i.e. 30 million relevant parking events per year)
- a regular user is active on 200 days per year (i.e. 150 000 vehicles are regular users)
- the additional expenditure for a service comprising dynamic TPA information is 60 € per year.

The expenditure of the hauliers corresponds to the costs incurred by service providers for integrating dynamic information into their devices and services.

These costs add to those estimated under Deployment option IV.

Comments

The present estimates comprise many approximations and assumptions. The most important are:

- basing the estimates of demand on international haulage as an approximation to long-distance haulage,
- neglecting the parking demand generated to short-distance haulage, thus implicitly focusing on the interurban situation and neglecting the peri-urban situation
- rough assumptions for deducing a number of parking search events from the available statistics
- rough assumptions on the number of concerned TPAs and priority zones; a higher number of TPAs and priority zones could be assumed if more weight were given to the peri-urban situation
- taking average values for hourly operating costs and external costs, neglecting the strong variation of these parameters across Europe; the congestion factor in the external cost could be assumed higher if the peri-urban situation would be given more weight,
- assumptions on the impact of the Deployment options IV. and V, for which no experimental evidence is available.

The overall quality of the estimates is limited by the assumptions. Consolidating and improving is a matter for debate, where there is little evidence to build on. There is room for improving the approximations, but this does not improve the overall quality of the estimates as long as the assumptions are so uncertain.

Therefore, the estimates summarised in the table below must be considered as orders of magnitude (figures are rounded).

Deployment Option	Estimate of benefit [M€/year]	Estimate of cost [M€/year]
Baseline	0	0
IV. (mandatory static information)	80	4
V. (IV.+ mandatory dynamic in priority zones)	160	25

For Deployment options with voluntary character, estimates will be lowered in proportion to assumed penetration rates. For Deployment Options that include reservation services, further assumptions would be needed, depending also on how such services would be oriented.

Besides the assumptions and approximations listed above, it should be reminded that the demand for safe and secure truck parking is highly sensitive to growth or shrinkage of road transport activity. Indeed, the economic crisis since 2008 has been mentioned by many of the consulted stakeholders.

Appendix L : Possible organisational solution (Static data)

Source: Information and Reservation services for Safe and Secure Parking of Trucks and Commercial Vehicles – Possible Organisational Solutions, Associated Costs and Benefits, Presentation by O. Arbeit de Chalendar DG MOVE, Stakeholder Workshop, Brussels, 28th June 2012.

The following extracts relate to static data only.

Possible organisation of responsibilities

	Who feeds database • Creates data • Updates data	**Who is responsible for database management** • Hosts database • Provides data to third parties
Basic static information	**TPA Operator**	**Member State** • Validates content
Advanced information about the parking area type	**TPA Operator** • Obtains certification where required	**Member State**

Provision of basic static information might be an obligation of the TPA owner

- Rule of principle, to be precisely defined
- Scope, conditions and exceptions to be defined in the implementation phase
  - E.g. an off-TERN park might have the possibility to opt out from re-use of data by Service Providers
- MS would implement standard processes/workflows and interfaces
  - Recommended standard format for database feeds (e.g. DATEX II)
  - User-friendly web interface for declarations by poorly equipped TPA owners

MS might delegate its responsibility

- To private parties, regional authorities, ...
- In the framework of international cooperation

Possible requirements for accepting a TPA in the database

European requirements
- Minimal road safety requirements
- Certification for high-security standards
- Coverage of TERN

Further requirements defined on Member State level
- Compliance with legal context (environment, ...)
- Consistency with transport policy, territorial development
- Acceptability of adverse effects
- ...

Possible rules of cooperation for static data

Data under MS responsibility would be provided to third parties for re-use
- For integration in navigation services,fleet management applications, …
  - In-vehicle devices
  - Websites
  - ...
- No restrictions based on IP rights for data producers

Service providers would have open access to MS databases
- Conditions according to PSI legislation (e.g. license agreement, access fee, ...)

The full presentation can be downloaded on
http://ec.europa.eu/transport/its/events/2012-06-28-workshop_en.htm

Appendix M : Table of indicators

Problem	General Objective	Operational Objectives	Indicators	Units	Targets ratings / Threshold to achieve (To be filled in by MS or EC)	Means (see §8.4)
1. The existing safe and secure parking places for trucks are not used efficiently everywhere on the core network	• To optimise the existing parking capacity, increase road safety and security of transport and the welfare of drivers	• Optimise the use of existing parking capacity	• Evolution of parking occupancy in priority zones ○ S+sTPA with low occupancy ○ S+sTPA with exceeding capacities situation	• Qualitative ○ % ○ %	• Positive evolution expected. ○ Increase by min 50% in 2 years. ○ Decrease by min 30% in 2 years.	E
			• Evolution of parking occupancy on scoped road networks	• Qualitative ○ %	• Positive evolution expected. ○ Increase by min 20% in 2 years.	B or F
		• Increase road safety	• Number of trucks parked offsite on scoped road networks	• Nb	• Decrease by min 10% every year.	B or F
			• Number of (road) traffic accidents involving a truck parked off-site	• Nb	• Decrease by min 10% every year.	F
			• Number of road fatalities and injured due to accidents involving a truck parked off-site	• Nb	• Decrease by min 10% every year.	F
		• Increase road transport security	• Number of cargo theft and attacks on parked truck on-site and off-site	• Nb	• Decrease by min 10% every year.	B or F
			• Number and localisation of truck drivers attacked while parked on-site and off-site	• Nb	• Decrease by min 10% every year.	B or F
		• Increase the welfare of drivers	• Evolution of working conditions for truck drivers ○ Feelings regarding parking process ▪ Ev. of time spent for parking ▪ Ev. of parking planning (when / by whom? / adequacy of planning and reality) ○ Knowledge of parking possibilities ○ Knowledge of parking characteristics ○ Feelings regarding personal security when parked ○ Feelings regarding services provided	• Qualitative ○ ▪ % ▪ % • Qualitative • Qualitative • Qualitative • Qualitative	• Positive evolution expected. ○ ▪ Decrease by min 10% / year ▪ Increase by min 10% / year • Positive evolution expected. • Positive evolution expected. • Positive evolution expected. • Positive evolution expected.	B or C
Drivers	**Specific Objectives**	**Operational Objectives**	**Indicators**	**Units**	**Targets ratings / Threshold to achieve (To be filled in by MS or EC)**	**Means (see §8.4**
1. No harmonised extensive updated inventory of suitable s+sTPA	• Define a harmonised data structure for inventory of s+sTPA • Define harmonised procedures to collect static data on s+sTPA	• Full inventory database of all suitable s+sTPA in the EU, yearly reviewed and updated, able to be centrally stored in a common format, providing all specified mandatory information	• MS s+sTPA database ○ % set up ○ % kept up to date ○ Overall completeness ○ Detailed completeness	• Quantitative ○ % ○ % ○ % ○ %	• Quantitative ○ >= 90% (amongst 27 MS) ○ >= 90% (amongst 27 MS) ○ >= 90% (amongst scoped road network) ○ min 90% of data attributes are filled in.	E
			• Number of s+sTPA included ○ Overall number of s+sTPA registered ○ Nb of privately operated s+sTPA registered	• Quantitative ○ Nb ○ Nb	• Increasing number expected. ○ … ○ …	E
2. Little dynamic	• Define specifications covering	• Full coverage of dynamic, dynamic data	• Number of identified priority zones	• Nb	• >= 30 zones in Europe in 1 year	A

information on free parking spaces in s+sTPA (few areas are equipped)	functional, technical and organisational provisions for dynamic data collection and exchange • Define an appropriate scope for implementation	collection technology on all s+sTPA in extended identified priority zones, providing and updating information on maximum occupancy and free parking spaces on s+sTPA. • Accuracy of data collection has an error margin below 1%	• Number of priority zones implemented and providing dynamic information	• Nb	• >= 30 zones in Europe in 3 years	A
			• Number of s+sTPA equipped with dynamic data collection technology	• % and Nb	• All dedicated TPAs within priority zones	A
			• Number of s+sTPA providing dynamic information to service providers • Number of s+sTPA providing dynamic information to end-users	• % and Nb • % and Nb	• All dedicated TPAs within priority zones • All dedicated TPAs within priority zones	A
			• Assessment of market maturity for detection technology	• Qualitative	• Positive evolution expected	D
			• State-of-the-Art accuracy of detection technology	• %	• >=99% on a fully automated, dedicated TPA • >=90% in the general case	A or B
			• Average price of detection technology for 1 truck parking space	• €/year (TCO)	• 100 €/year TCO (total cost of ownership)	A or B
3. No minimum definition on how users can access information on s+sTPA	• Define specifications how to disseminate information on s+sTPA to end-users	• Continuous accessibility of static data for end users via Internet • Continuous accessibility of static and dynamic data for service providers through an interface that allows for integration of data into other standard applications (trip planning, fleet management) • On-board equipments are providing information on s+sTPA to the end-users.	• MS s+sTPA database ○ % freely accessible to any other parties for re-use.	• Quantitative ○ %	• Quantitative ○ >= 90% (amongst 27 MS)	E
			• Number of Services providing truck parking static information	• Nb	• >= 5	B
			• Number of Services providing truck parking real time information	• Nb	• >= 5	B
			• End-users satisfaction / Driver's point of view/ satisfaction of truck parking information services provided	• Qualitative	• Positive evolution expected.	C
4. No harmonised way to reserve a parking space	• Establish specifications for a reservation service: based on existing standards and technologies • Ensure compatibility, interoperability and continuity of services • Define an appropriate scope for implementation	• Provision of a reservation service for TPA in consistency with information services.	• Number of Services providing truck parking reservation	• Nb	• >+=5 Service providers providing at least 100 s+sTPA offers in at least 5 MS	B
			• End-users satisfaction / Driver's point of view/ satisfaction of truck parking reservation services provided	• Qualitative	• Positive evolution expected.	C

Context	Indicators	Units	Targets ratings / Threshold to achieve (To be filled in by MS or EC)	Means (see §8.4
• Take into account the context in which the changes generated by the specifications take place	• Evolution of freight and logistics services ○ Number of trip planning and fleet management software which includes truck parking information (idem for reservation service) ○ Market penetration of trip planning and fleet management software which includes truck parking information (idem for reservation service) ○ Market share of trucks equipped with on-board equipment capable of displaying information (idem for processing a reservation) ○ % of equipped truck using truck parking information (idem for reservation service) ○ Competitiveness due to parking information and reservation ○ Evolution of logistics costs related to parking information and reservation services ○ Estimation of energy savings and emissions avoided (fuel consumption) due to the use of parking information and reservation services		• … ○ … ○ … ○ … ○ >= 90% ○ Increasing evolution expected. ○ Decreasing number expected. ○ Increasing evolution expected.	C