




**Intelligent Cars  
Thematic Network**

## **Final Roadmap for the Pre-commercial Procurement of ITS**

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## **1. Introduction**

### **1.1. Intended audience**

This document was prepared for the European Commission and iCars contacts database including the group of contact persons on pre-commercial procurement.

### **1.2. Structure of the document**

The document consists of the final roadmap for the pre-commercial procurement of ITS. It includes a presentation of the pre-commercial procurement process. This is followed by a presentation and discussion of the key questions to be considered for a contracting authority to embark in pre-commercial procurement. Then several potential cases of PCP in the field of ITS are analysed in the framework of this roadmap, including integrated ticketing, impaired driving and truck parking.

### **1.3. Objective of the document**

The objective of the document is to provide a reference for introducing the key challenges for pre-commercial procurement of ITS; it is a roadmap for this procurement. The roadmap contains the key steps and phases to go through while preparing and running a pre-commercial procurement process.

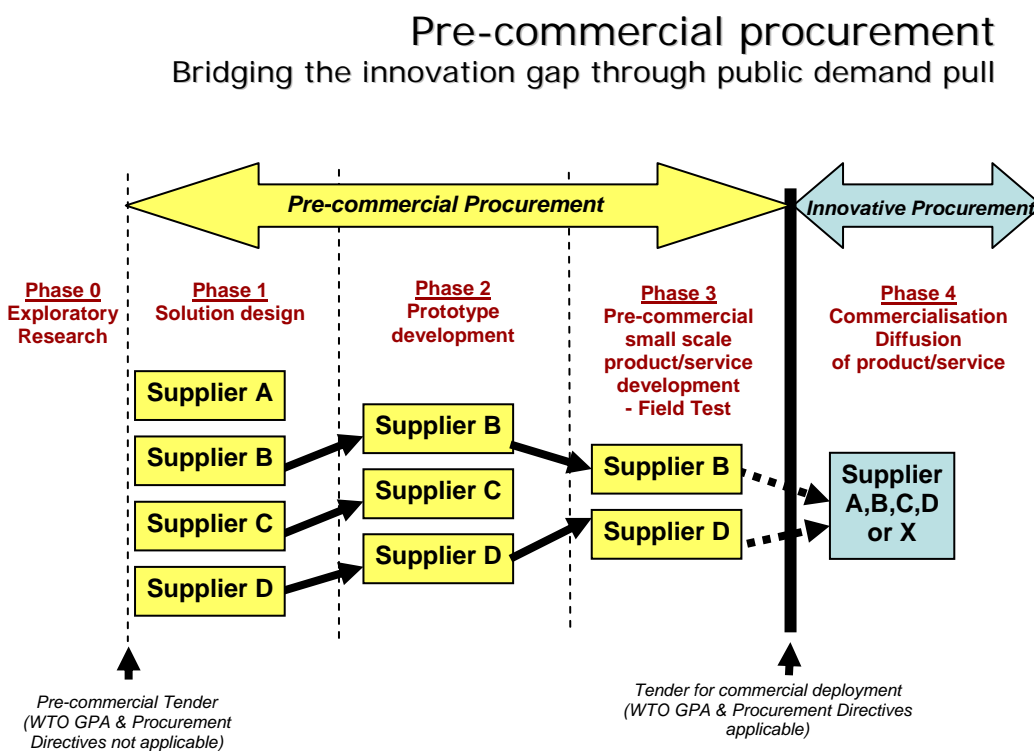
## 2. Roadmap for the pre-commercial procurement of ITS

### 2.1 The pre-commercial procurement process

The European Union published a communication on *Pre-commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe* in December 2007 (COM (2007) 799 final).

Pre-commercial procurement of innovation refers to the procurement of technological innovation up to and including a first pre-commercial volume batch of products and / or services validated via field tests. Pre-commercial procurement of innovation involves direct public R&D investment in the first three phases (pre-commercial part) of a typical R&D project life cycle.

The pre-commercial procurement process is best described by the graph below.



#### *A sequence for a pre-commercial procurement process*

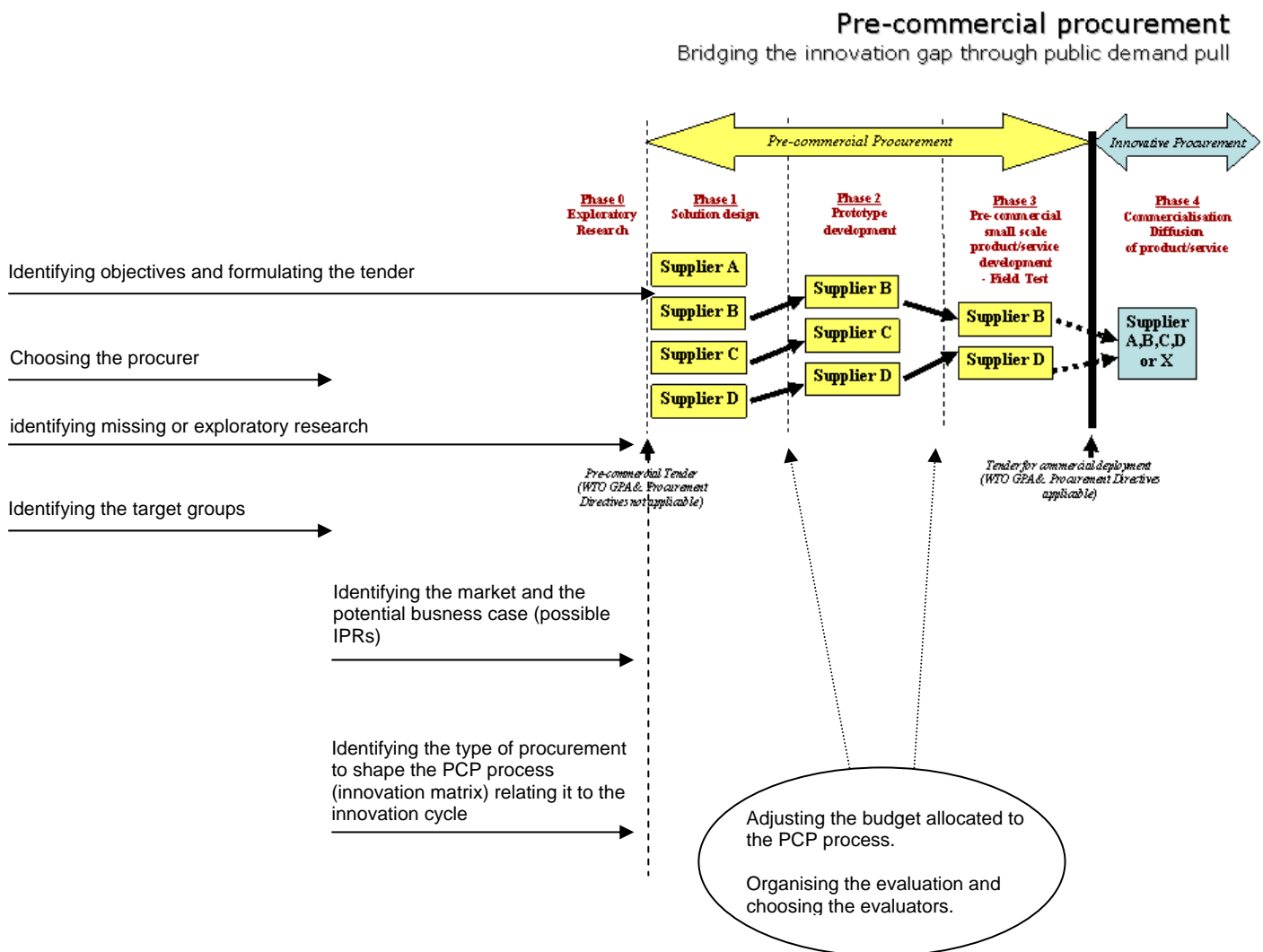
The first phase of the pre-commercial procurement consists of the publication of the tender. Respondents to the tender make proposal to answer the challenge and address the question. They do not carry out research at this stage. A panel of evaluators assesses those proposals and selects the ones it considers the most promising.

Obviously, the number of companies selected mainly depends on the quality of the proposals and the budget allocated to the next phase. This next phase consists of funding feasibility studies for the proposals selected. After the feasibility study, a small number of

bidders are invited to continue and they receive some funding to develop prototypes and test them. Finally, one or more winners are invited and funded to produce a small series of innovative products or solutions to answer the challenge proposed in the tender.

Many variations are possible within this process. Depending on the objective of the authority, the expected response to the tender, the nature of the question raised and the budget available for the process, the number of phases can vary. But a minimum of two phases is necessary to give sense to pre-commercial procurement.

This roadmap address some key questions about this process when applied to Intelligent Transport Systems, for instance the questions related to the number of phases, the evaluation of proposals and bidders at each phase of the process, the budget, etc.



## 2.2 Objectives

The definition of roadmaps for the pre-commercial procurement within iCars has been carried out to illustrate the challenges and practical questions that any procurers should address when applying PCP in the ITS sector.

The ITS roadmap identifies key questions to be considered by procurers at the various stages of the PCP process. It also addresses some challenges which are more specific to Intelligent Transport Systems, intending to establish a stronger link between the R&D efforts in the ITS sector and the potential customers in the public sector who might profit from being engaged in the innovation process.

These questions are:

- what type of PCP, what objective and what role for the public authority / the procurer?
- how to formulate the tender?
- what type of public authority should be the procurer ?/ what level of governance?/ joint procurement?
- what is the target group?
- how to balance risk sharing?
- who should own the intellectual property rights?
- what is the corresponding master plan?
- what is the cost of the process and what budget should be foreseen?
- who are the evaluators?

Based on the selection of potential cases for the PCP of challenges in the transport sector involving ITS, the questions identified in the general roadmaps for ITS are considered in relation to each of these specific potential cases.

### **2.3 Selection of the potential cases for PCP**

The potential cases for the pre-commercial procurement of challenges related to the ITS sector have been selected through a multi-stage process. The process was based on some guiding principles and recommendations for the use of pre-commercial procurement and it led to a feasibility analysis of several ITS topics that accord to the idea of PCP.

It is deemed specifically relevant to address a specific problem of society or governments, or when the government wants to trigger change, when no obvious solutions are available. It is also useful to speed up the development of new products and services, and when one aims at a solution to a problem.

Two workshops enabled a discussion of some of the main challenges in the transport sector related to ITS and led to the identification of some first potential challenges for which PCP could be used. Several ITS experts were contacted and interviewed to assess their views on the potential of PCP to support innovation and deployment in the ITS sector and to identify some challenges that they believed could be usefully addressed by PCP. Following this process, a list of potential cases was established. The list was further refined by the iCars partners, who selected the most interesting cases. The selection was based on the extent to which each case illustrated the key points to be addressed for the PCP of ITS-related challenges. One of the most important questions considered while selecting the cases was the degree to which research in innovation was expected to play a role in the development and deployment of solutions.

## 2.4 The roadmap: addressing some key questions about PCP regarding intelligent transport systems

### 2.4.1 The challenge of formulating the question supports the PCP process

One of the tests to assess whether a challenge can be best addressed by pre-commercial procurement consists of defining the ability to express the questions that will support the tender clearly and concisely.

The tender should mainly consist of the question that explains the problem to which respondent are expected to propose a solution. The question should be as open as possible to encourage the broadest possible range of solutions, thus stimulating innovation. The question should allow non-traditional players to consider developing solutions. It should also allow for the technological transition between sectors, attracting players from other sectors, and for the integration of technologies into new solutions. Obviously, the question in the tender should be sufficiently clear to ensure that answers will exclusively address the challenge posed, thus maximising the relevance of the answers.

The procurer should decide how much technological guidance it wants to give. The question will be formulated differently depending on whether the procurer wants to be entirely technologically neutral or wants instead to stimulate answers from a specific sector or to suggest a technology. This is of course an important consideration for this roadmap since it refers to the potential use of PCP to stimulate ITS. This means that answers using a certain type of technology coming from the ITS sector are encouraged. The challenge then becomes formulating the tender so that it remains open enough to stimulate innovation and a new approach to the problem while encouraging intelligent transport solutions to the specific problem.

The pre-commercial procurement of a new system to monitor dikes in the Netherlands is an example of a successful pre-commercial procurement tender. The formulation of the tender has allowed the emergence of new solutions, hi and low tech, from various sectors previously not involved in this type of activity.

The tender contained the following text:

*“The Ministry of Transport and Water Management invites companies to submit proposals for feasibility studies on new monitoring techniques for dike and dam management and for early warning systems on weak spots in order to prevent damages to dikes and dams and thus to prevent disasters. The most promising proposals will get a contract to perform a feasibility study.”*

When you transfer this approach to define a tender in the area where ITS could be applied, it is important to highlight those demands that are to be solved only by an ITS solution. This can be done without preferring a certain technological solution or even a certain supplier if the mix of demands involves the overall picture of benefits.

The requirements could include the need for a solution representing a sustainable strategy and based on a wide impact or cost-saving potential with regard to the developments in similar infrastructure systems (ICT). This would still allow conventional

solutions to participate in the competition or be part of the final proposal, but the tender highlights the advantages that only ITS are able to provide.

Still, it is important to foresee the different benefit potentials of several ideas competing in a PCP process when setting up the tender since the procurement laws are intended to protect an objective selection and should not be undermined.

The synergies of both the objective procurement decision and the research and innovative potential of ITS solutions in joint approaches are one crucial point of this form of cooperation between ITS suppliers and procurers.

#### 2.4.2 The innovation matrix: defining a strategic mix of pre-commercial procurement and R&D funding

The main issue in the public procurement of innovative technology in general is why the public stakeholder, i.e. the government and its direct and indirect sub-level institutions (e. g. road operators, coordinating & monitoring institutions), should intervene in an ongoing innovation process and consider a committed funding

While R&D funding on a specified topic is a common approach to provide orientation, PCP may be more efficient; the final outcome is a precise application because the implicit problem-solving process and the resources in it are more focused – not least because of the challenge of ideas in the several PCP stages.

But this main advantage is related to the risk of spending time and money on options that are later sorted out, whereas the common procurement approach has an early focus on strong collaboration with one single supplier. This leads to the need for a preliminary assessment of the scenario that determines the allocation within the range of options that could shape the strategic behaviour of a public actor. If a high investment is necessary and the synchronous coordination and commitment of several actors is needed, it is especially important to define the scenario.

Driven by the interest in achieving promising benefit potentials, the public interest might help overcome obstacles for innovating companies even before the question of a profitable market deployment arises. Thus, technologies not yet existing can compete with established options and profit from public spending before specific products are developed - even more so if a promising future market and high benefits are expected and favoured by the public authority considering PCP.

By formulating open questions that allow a broad field of answers (“How can safety be increased?”), this constellation where PCP is applicable might be identified. But before initiating PCP activities, the scenario requires further analysis. In case of ITS, this analysis also includes an overview on the supplier side of the technological status quo and expectable proceedings. This first analysis of the initial situation needs to address the two main subjects:

- What type of procurement or public research funding is considered appropriate for the selected business case?
- In what early stage of the innovation process of an ITS should the PCP process start?

In its “Flanders Action Plan – Public Procurement of Innovation”, the Belgian IWT proposed solving the question of whether or not public actors should intervene in a market and ongoing research by establishing **innovation platforms** that provide a benchmarking of the different ways to answer the identified challenge and finally decide whether PCP is the best suitable instrument to provide the innovative solution.

The responsible public authority – in this case the IWT – identifies the challenges for which it is possible to offer a solution. Potential contributors may react by submitting

proposals of their ideas, which is the step necessary to participate in the innovation platform.

To ensure an open and transparent procedure, the publicity innovation platform is set up as broadly as possible and follows a specified process that includes an analysis of the state-of-the-art knowledge, a market consultation and a dialogue between the participants, all leading to a conclusion on the follow-up trajectory.

For the PCP roadmaps that allow a successful deployment of ITS, these innovation platforms seem to be a fair and efficient way of integrating several stakeholders into a common solution and of generating commitment to the decision to start a PCP tender. But the risk for ITS solutions should be addressed by giving an orientation of the PCP initiative to avoid an inefficient and misleading development:

- When compared to other options to solve the identified challenge, the benefits of ITS should be taken into account – starting by requirements, e.g. with a focus on innovative technology.
- When analysing the different PCP options and ways of creating a strategic policy mix containing PCP, the complexity of ITS solutions should not lead to overall disadvantages, but it can be addressed by integrating R&D funding and procurement into a synchronised innovation strategy.

The 'Innovation Matrix' as seen in Figure 1 helps to illustrate the different types of relationships between procurement and the R&D process. Depending on the strength of the connection between the innovation process and the procuring authority, which is possibly interested in the further development of an innovation, there are different ways to get procurement involved in the early stages of innovation.

Three types of relationships can be differentiated by the 'policy rationales', which are the basic argumentation of why a PCP intervention is considered needed:

- Direct procurement: This means the government is the sole end user, causing a strong intrinsic interest of the policymaker in the whole innovation process toward successful innovation. If the benefit potential, e.g. preventing a distinct number of harmful accidents, is considered high and obvious, this may result in direct PCP funding during the idea & concept generation phase since the demand side of the not yet existing market might consist only of the procurement of a public actor. Still, the recognition of such a strong connection between a raw concept and a procurement strategy is influenced by technological complexity and uncertainty. Direct procurement is likely to be used for instance when a road operator is public and is using pre-commercial procurement to support the development of a product to answer a challenge it has on its own network and that it plans to buy to equip its network. This could be the case of a national road operator for instance.
- Cooperative procurement: This type means that the public and private parties may both be end users of an ITS innovation. Intelligent vehicle safety systems such as autonomous brake assists may be used in private cars as well as in police cars. But is also possible that the private and public sector need to provide complementary parts of an innovation, such as V2I safety systems. By choosing a cooperative procurement approach, vehicle manufacturers on the vehicle side and road operators on the infrastructure side could support the complex progress on cooperative safety systems.
- Catalytic procurement: The public actor acts on behalf of private users but is itself not a final end user. To identify this type of procurement, the procurement strategy might include spending activities that have indirect effects on technologies that need catalytic support in the early stages of innovation. For instance in some cases the development of in-vehicles ITS applications for road safety, which is expected to be ultimately bought by the customers of the vehicles, could be the result of a catalytic pre-commercial procurement process

supported by a public authority which is pursuing its objective to improve road safety.

	Precommercial				Commercial	
	concept	feasibility	prototype	pilot	Integration/ adaptation	Diffusion
Direct procurement						
Cooperative procurement						
Catalytic procurement						

**Figure 1: Innovation matrix - phases of innovation process vs. role of procurement**

With respect to ITS, the main field of action is the state-run infrastructure system and its needs to maintain and improve safety, efficiency and sustainability. These objectives can be broken down into a broad set of further economic, ecologic and societal questions that have to be solved while under the pressure of a challenging resources and capacity situation.

Because of the collusion between the public authority and, for example, road operators aiming for an ITS option, pre-commercial procurement in this sector is probably more likely to be associated with a cooperative procurement process than in sectors where the public authority is not at the same time a major actor. Based on this typology, the possible options throughout the innovation process need to be evaluated to find ways to implement PCP that match the policy rationales of the different public procurers related to this specific field of innovation. For this purpose, PCP can cover the first phases only of the innovation cycle (basic and applied research) or all the phases of the innovation cycle until pilot demonstrations.

The decision might also include the option of combining a PCP approach in a certain field of action with the planning of direct procurement in another field of action. ITS-like cooperative systems include subsystems or components that could be procured by different authorities in a joint effort if the interests are linked.

The described draft approach leads to a short and effective analysis of whether PCP is an option or if other approaches seem suitable. Based on this general direction and an approximate classification, the PCP initiation needs a framework that leads to the final PCP project with the associated concept design and selection process.

Since challenges related to ITS are more comprehensive compared to smaller-scaled, single-product procurement activities, the innovation matrix leads to further preparation regarding

- Content: what exploratory research is crucial for the final procurement?
- Structure: is there a business case for the potential parties involved in PCP and to what extent do different parties need to be part of the PCP project?

### 2.4.3 Description of existing or missing exploratory research

It is unlikely that pre-commercial procurement will address a challenge that is entirely new and that has never been considered before. There should not be existing satisfying solutions, but any solution will build upon some existing knowledge.

Before the launch of the tender, the procurer must make an overview of the missing and exploratory research. This will provide information on how the issue has been addressed so far, what potential paths have been explored and proved wrong or promising. This will enable the procurer to better define the limits of the tender and better formulate the question to ensure that it addresses the whole challenge.

Obviously, knowledge about missing and existing research is also useful in building the business case and for several of the other questions mentioned here that will be addressed by the procurer.

It helps to identify the potential actors interested in developing a solution and to estimate the number of potential players. This is important to see how much funding should be invested in the process to keep the level of risk acceptable to interested parties so that it justifies investments on their part. The quality and amount of available research is important information for this purpose.

Finally, the investigation and description of existing and missing research, possibly beyond only exploratory research, allows a sound evaluation to be made about how much more research is needed, in particular in relation to the amount of integration/adaptation of existing solutions which could provide a desired solution to the challenge.

This process contributes to validating the choice of pre-commercial procurement to address the question. Indeed, if this task concludes that most of the necessary research and innovative thinking has already taken place and that what is needed is an innovative way to integrate and/or adapt existing solution, then probably the case considered is not fit for pre-commercial procurement. Indeed, in this case there is most probably not enough research to resort to a legal framework outside of the procurement directives.

### 2.4.4 Making the business case: identifying stakeholder

Following the basic decision that procurement should intervene in the pre-commercial phase of innovation, the analysis of missing research delivers the framework on content. The next step moves from testing the feasibility of available PCP options to drafting the specific link-up of the on-going R&D and procurement activities.

Regarding ITS, one sole stakeholder might not be capable of or interested in bearing the cost of development and needs the commitment from similar or additional institutions to decide for the PCP approach.

The business case depends on who is the procurer. Therefore, the public authority that initiated the PCP analysis – or brought up the question of PCP as an option - coordinates the process of identifying the best placed procuring entity. .

The definition of the potential procurer should cover the following aspects:

- What type of public authority should be the procurer?  
The estimated socio-economic benefit which makes certain PCP options feasible for ITS in general has to be adjusted to the budget options and policies of particular institutions. By refining the PCP concept, the proposed activities should address those requirements and accord to them.
- What level of governance should support the PCP of ITS?  
There could be local, national or European procurement activities involved in the innovation of ITS so it is very important to keep in mind on which level the final outcome of the innovation process is considered best, taking only realistic options into further account.
- Is joint PCP desirable? Should it involve authorities from different countries?  
In traffic policies, an open question which is expected to be solved by ITS often occurs in different regions or countries. By aiming for a wider set of procuring authorities, the risk of failed innovation can be reduced by a more cost-efficient business model, i.e. higher demands of several procurers, but may cause a more complex PCP process because of the influences on the planning and more difficult IPR questions.
- What characteristics constitute the target group?  
When deciding about a PCP concept, the ITS innovation to be achieved needs to be described as a solution for a certain type of end user, which is also linked to the question of whether an ITS requires direct, cooperative or catalytic PCP.

Summing up these questions, which authorities acting as procuring actors should be addressed, hence whose procurement budgets seem adequate to invest in a ITS solution supported by the PCP business case? This may require strategic adjustments, influencing the choice and mode of options addressed by the PCP concept.

#### 2.4.5 Definition of the PCP project

The developing market for an ITS which should be supported by the PCP is the next step when analysing a PCP concept. Up to this stage, the possible procurers and budgets should have been decided upon. This narrows the focus on market characteristics such as region, involved institutional types, number of actors and estimation of market size and structure.

The economic perspective on the pre-commercial use of procurement resources now requires a more detailed analysis of the possible business cases, taking into consideration the distribution of risks, incentives and costs (capital and running costs) for the procuring authority and the suppliers.

#### Risk sharing

While traditional procurement acts only on the demand side of an already defined market – the vendor provides a product or service, while the procuring authority accepts or negotiates the “ready-to-deliver” good –, the involvement of the public side during the early innovation phases implies that there are certain technological and financial risks. These risks need to be shared, making it necessary for the public sector to get involved and help the R&D to succeed with strategically appointed resources.

An ITS option proposed in a PCP process should result in a risk analysis that clarifies whether or not the risk may and should be shared and that provides a solution of how this can be done between..

- ..the supplier and procurement side;
- ..the potential partners on the ITS supplier side;
- ..the potential different procuring entities on the demand side.

While reducing the uncertainty of a proposal, the complexity resulting from the different options is a problem for ITS. But it is an advantage for the distribution of risks since the risk for the individual party will be lower once the PCP activities have started. Additionally, the different competences of the parties involved help them to be more aware of possible risks, which results in appropriate pressure on all parties involved to commit to the PCP project.

### Intellectual Property Rights

Another aspect of the PCP-influenced market is the distribution of IPR which are not automatically clearly assigned to the supplier, the ITS innovator.

Preferably, the development of ITS leads to a clearly defined IPR situation in which the innovating actor retains control over the IPR and compensates for the risk taken by the public authority in another way. However, there might be cases where the legal or operable perspectives on an innovation would require a further involvement of the authority in the later innovation stages of an ITS, which could also mean a partial acquisition of the IPR could be useful to retain the control over private activities, e.g. guarding consumer rights or data privacy by simply not allowing a R&D turnaround in the strategic direction of ITS. This would simplify the involvement of other funding and save the effort of legally balancing private and public interests.

In the case of ITS, the procurer may also consider the possibility to upgrade systems to keep up with technology developments, or to maintain control over maintenance costs. The challenge is to be able to maintain and upgrade systems without being dependent exclusively on one supplier, and to have the possibility to proceed to the upgrades of the choice of the procurer independently from the initial supplier. This for instance is an important concern when deciding the distribution of IPRs in the case of the development of systems supporting congestion charging schemes.

The procurer may also be interested in keeping part of the IPR to ensure it will retain control over a potential upgrade of the system and not be entirely dependent on developments and conditions of the initial supplier for this.

This means that an adequate solution for most pre-commercial procurement cases would keep as many IPR as possible with the supplier and would transfer only those rights to the contracting authority that it needs in order to satisfy and safeguard its strategic goals. Key influences are the expected possible strengths and weaknesses of the demand and supply sides, defining the need to partially obtain IPR in the PCP process.

### Estimations on development costs & running costs

While risk assessment and considerations of legal consequences of PCP involvement are general planning activities in the PCP process without a specific partner, cost assessment defines the very specific, operative part of a PCP business case and has to be calculated.

ITS may be complex constructs of both physical products and services so that several cost dimensions must be considered. The analysis of these cost components should consider:

- development costs of ITS in total & share of the R&D costs covered by PCP funding
- running costs of ITS: summing up the total costs which occur on the procurement side, it is highly important to see the overall picture, taking risks and possible technological and market development into account.

This step of the analysis of the business case requires input from possible R&D partners, meaning that the pure testing of feasibility does not suffice to evaluate the business case in an abstract, general form.

#### 2.4.6 Identifying the relevant political environment and Master Plan

According to the OMC-PTP manual, *the master plan is an input provided by the contracting authority. It acts as a guide to help find a way to achieve the desired outcome with regard to a problem starting from the actual situation. A business case can further be developed into a master plan with more detail about the long-term strategy and important milestones in order to achieve the final goal starting from the actual situation.*

The master plan is the broader framework in which the PCP process takes place. It is the framework within which the public authority address the challenge which is then considered in the pre-commercial procurement process. The master plan is part of a policy strategy and the framework which allows turning policy into practice.

In the case of the pre-commercial procurement of ITS, the master plan may support the implementation of two different policy strategies. It can focus on the deployment of ITS systems and therefore aims at stimulating the market for a product and the solutions it can provide. It can also - and this is more likely - focus on the challenge related to transport that the public authority wants to address. This challenge can consist of the reduction of road fatalities and be related to policy initiatives on the topic, on the reduction of transport-related CO2 emissions, on the reduction of congestion, etc.

#### 2.4.7 Evaluation: costs and identification of key partners in the evaluation process

The master plan contains the relevant characteristics of the PCP concept, representing the currently available state of knowledge on the question to be solved, possible ITS being the options to solve that problem and a model of how this demand and offer could possibly come together in a PCP-driven market.

But the field of action has to be considered as complex and uncertain, making it necessary to evaluate the proposed actions further before the committed authorities can come to an official “pre-procurement” decision. Depending on the time perspective, the technology focus and several boundary conditions such as the existence of analogous markets or several as yet undecided options of PCP involvement, this evaluation may be extensive.

This leads to a particular need for planning this evaluation since this may require research resources and cause evaluation costs:

- Who should be associated with the evaluation process?

Apart from the supplier and the authority, evaluators who can assess the financial sustainability of the proposed solutions (business plan) such as for instance venture capitalists, and the degree of innovation in these solutions should also be involved.  
How to use high knowledge in the process?

The challenge consists in bringing the required knowledge in the evaluation process while it may lie to a large extent with potential suppliers involved in answers to the PCP tender.

This must be anticipated for the procurer to avoid depending exclusively on the information provided by the suppliers.

- What are the elements to take into account about the evaluation process that must be budgeted for this process by the contracting authority?

If these key issues are solved, the actual evaluation of the PCP proposal can conclude whether or not the assumptions and expectations regarding the innovative ITS may be validated and whether or not the involvement in ITS R&D by PCP is wanted. A strategic orientation following the described roadmap might help to link procurement resources in the transport sector with R&D efforts in this field, overcoming restrictive budget policies and setting the course for new markets that are easier to deploy by ITS.

### **3. Roadmap for the pre-commercial procurement of Integrated ticketing**

#### **3.1 Objectives and formulating the challenge**

The case considered here is the development of an integrated ticketing system at the local level where there is a very high degree of complexity in the system.

There are around 30 different public transport operators operating in the region. These operators are not franchised.

Currently, the take up of paper based integrated ticketing is limited. There is a desire to move on to a smarter platform to increase flexibility of the product offering and to reduce operating costs

There is a paper based single ticket scheme, operated by a public entity on behalf of the operators, which operates on an integrated basis across different operators and modes. The return to operators is decided on their share in the scheme. Otherwise each operator sells its own tickets on board vehicles.

Currently, the ticketing system has a turnover of £2 million with 10% operating cost.

The objective is to increase the uptake of the single ticket product by making it smarter and easier to purchase. The solution needs to be acceptable to the private operators and there needs to be a mechanism to validate tickets, record the transaction and to improve clearing between operators. The ticket has to be a personal ticket.

It must be taken into account that smart card readers have been installed on all buses as part of a government initiative.

The challenge consists mainly in bringing together the various operators and associated actors to cooperate and accept an innovative single integrated ticketing scheme in the framework where the public authorities who have interest in this can only create incentives but not impose the scheme on the operators.

### 3.2 The innovation matrix

	Precommercial				Commercial	
	concept	feasibility	prototype	pilot	Integration/ adaptation	Diffusion
Direct procurement						
Cooperative procurement						
Catalytic procurement						

Innovation matrix

←————→

The interest of the public authority in this case consists in stimulating the development of a product and a service, the integrated ticketing scheme, which would be then taken up by the transport operators.

We are therefore here looking at a catalytic procurement process where the public authority acts on behalf of private users but is not itself a final end user. It is however strongly interested in the innovative product and service resulting from this process.

So much so that the favoured solutions would bring together the operators and as in the current setting, they would delegate to the public authority the management of the integrated ticketing scheme. But the operators would be the owners of the scheme.

The interest in catalytic pre-commercial procurement process here is specifically related to the provision of a service of general interest in the framework of a deregulated market. The public authority is interested in a scheme which would make public transport more attractive, which would contribute to achieve its policy objectives, and helps to bring a better return on investments in new public transport services such as a new tram in this particular case.

However, it does not operate public transport services, and could therefore not directly implement this scheme. Nor can it make it mandatory for operators to adopt smart integrated ticketing.

As the public authority is not the end user and customer of the integrated ticketing scheme, but the manager of the scheme and/or the transport operators are, their interest must be carefully considered in the evaluation of the solutions proposed.

Catalytic pre-commercial procurement is therefore in this framework a tool to bring on the market an innovative solution, carefully considering the incentives of the various players thus encouraging its market take up.

Considering the role of the public authority, the pre-commercial procurement process should cover the concept proposals, feasibility studies, prototype development and pilot phase of the innovation process.

A first phase should consist in the publication of the tender, which should be answered with concept proposals.

The selected proposals should be funded to develop feasibility studies for three to five proposals.

Two among those should be funded to develop both prototypes and test them in pilot demonstration schemes.

The inclusion of the pilot demonstration is important as it would offer the opportunity to engage some transport operators in the test and implementation of the schemes, thus validating or invalidating their interest in the scheme and the structure of their incentives which would secure their participation in the deployment of integrated ticketing.

### **3.3 Description of existing or missing exploratory research**

Ticketing systems are readily available on the market but as yet there are no systems available off the shelf that can accommodate multi operator applications. The concept that is required may be similar to the clearing system operated by the banking system. The research is required to come up with a solution that meets the multi user needs.

We are looking for the supplier market to come up with innovative ways of achieving the objectives. The solution may not be limited to traditional hardware and software products but should look at the wider back office applications.

For example might there be a solution using bank contactless card or mobile phone technologies? Whilst the development could be undertaken for the Edinburgh city region One Ticket system the solution may be suitable for other transport operations and allow cross border integration.

There is also a strong challenge in creating the proper cooperation framework and incentive structure to bring together the transport operators of the region and the public authority. Important innovation, supported by appropriate technologies (back office, clearing, data exchange, etc.) is required.

### **3.4 Main actors**

The objective is to reach the situation where the *public authority operates the scheme and the scheme is owned by the operators*.

The public authority funds PCP through revenues of existing schemes or from government grant.

#### **3.4.1 Who should be the procurer?**

The procurer should be the one ticket company which is owned by the operators but operated by the public authority. The funding would come from the public authority which at the initial stage has the strongest interest in the development of the scheme.

#### **3.4.2 Target groups**

The end consumers of the integrated ticketing schemes are the travellers: current and future public transport users.

Intermediary actors are essential in this case, as they are the public transport operators which will cooperate to enable the integrated ticketing scheme while they operate in a commercial environment.

Potential and desired suppliers are smart card suppliers, telecom operators and banks. Transport operators are unlikely to be leading suppliers and bidders to answer the pre-commercial procurement tender.

Obviously, the public authority, and its various relevant components (traffic and mobility department, environment department, innovation and development agency, purchases, etc.), as catalyst part in the process, is a key actor.

### **3.5 Finding a market**

The pre-commercial procurement process should be built in such a way that it allows for the scalability of the system, at least at the regional level, beyond the initial territory considered.

This should contribute to help addressing the interoperability incentives and challenges for a further deployment of the system. The way this will be addressed largely depends on the supplier, their nature and market of reference, and the partners in the winning consortia.

The allocation of intellectual and property rights can encourage to take interoperability into consideration.

They would stay with the procurer for the local implementation of the scheme, but be left to the supplier for the implementation of the scheme elsewhere.

This would encourage the suppliers to consider interoperability. It would also create an incentive to encourage bidders, as they would receive funding for developing an innovative product locally that they would be able to sell elsewhere.

This allocation of intellectual and property rights is also designed to limit the amount of public funding to invest in the pre-commercial procurement process, as the potential market take up elsewhere is an incentive beyond the proposed funding for suppliers to take part to the process.

On the side of the procurer, retaining intellectual and property rights locally is a guarantee that running and operating cost will be kept under control. In particular, the procurer will keep control over the opportunity and price of upgrading the system and will not depend exclusively for this on the price proposed by the supplier of the system. The procurer will also keep opened the option to bring in other suppliers for the upgrade of the system. This option would be much more limited if the IPRs would stay entirely with the initial supplier.

### **3.6 Political environment and Master Plan**

The development and implementation of a smart integrated ticketing system in this area is part of the broader mobility strategy in many respects.

It is a tool to support the use of public transport, and therefore contribute to a better urban and local mobility. It is also as such contributing to local environmental objectives, such as the improvement of air quality and reduction of CO2 emissions from transport.

Finally supporting public transport is contributing to improve mobility locally and decrease congestion.

All these elements are the heart of local policy strategies. As a consequence, smart integrated ticketing ranks highly on the agenda of the public actors.

These objectives are shared with the national level, which therefore also support such a scheme. This increases the chances of funding and support for the pre-commercial procurement process on this issue.

The lighthouse project of this area in terms of mobility is the building of a new tram system, which attracts great public attention. The smart integrated ticketing scheme would be consistent with this project and would help to better integrate the new tram system in the local mobility system as well as encourage the use of this tram system. It would therefore contribute to the success of this investment in public transport. This is of course of great importance for the local council which would give it a high priority for this reason.

The smart integrated scheme does not however rank very high on the agenda of the local transport operators, until it is demonstrated that it would be at least neutral for them, or that they would gain from it.

This roadmap can be extended to integrated ticketing solutions in situations where there are several public transport operators. In Europe, it can help to address this challenge in the UK where there is a more deregulated public transport market than in other countries.

But it could also be useful in countries where there is a regulated public transport sector in which several operators have each different public transport contracts, awarded by one or more authority, on a territory which has a specific coherence, such as a region or an urban area. In this latter case, the public authority, since it can rely on contracts with the operators – unlike in most of the UK, has more leverage to influence the operators to move towards integrated ticketing. It may in this case, though the public transport authority, be more tempted to use direct pre-commercial procurement.

This roadmap is also relevant to bring integrated ticketing or payment for various services. It is focusing on an integrated ticketing common to different public transport services. It can also illustrate a process for the pre-commercial procurement of integrated charging schemes for various mobility services managed by different operators, such as car sharing, public transport, parking, public bikes, even infrastructure charging.

### **3.7 Evaluation and identification of key partners in the evaluation process**

Who should be associated to the evaluation process?

The evaluation process of the proposals should be led by the procurer, which is the operator of the current one ticket system. The evaluation panel should include a majority of representatives of the local authority as they have the strongest interest in the system.

The evaluation should bring together the right set of competencies, in particular to assess the technical potential and feasibility of the solution proposed but also the

relevance and strength of the cooperation and incentive model supporting the business case for further deployment of the proposed solution.

The main challenge is to define the extent to which transport operators should be associated to the evaluation process.

Those associated to one or the other bidding consortium should be excluded from the evaluation team. However, they will remain collectively represented as co-owner of the procuring authority...

This is mainly down to the role of the operators in the pilot demonstration of the scheme.

As a consequence, one could imagine a mechanism in which operators are excluded from the first phase which consists in the submission of concept proposals but take part to the evaluation of these concept proposals. Once the selection is done, and some proposals are funded for feasibility studies, operators are allowed to join bidding consortium but are not anymore associated to the evaluation process.

This could be a solution to use the required knowledge in the process while guaranteeing its fairness.

The budget of the pre-commercial procurement process should foresee a few hundred of thousands euros, up to 300,000 euros, to fund feasibility studies.

It should then fund the development of prototypes and the demonstration of the innovative scheme, with a total budget of up to 2 million euros.

## **4. Roadmap for the pre-commercial procurement of solutions to address impaired driving**

### **4.1 Objectives and formulating the challenge**

The objective is to encourage the emergence of new approaches and new solutions to detect impaired driving behaviours to prevent drivers in dangerous conditions to drive and increase the risk of accidents.

Impaired driving behaviours are for instance driving under the effects of alcohol, drug, medication, tiredness, etc.

Impaired driving should be better detected and drivers in these conditions should be prevented to drive or driving conditions should be changed. Once abnormal behaviour is detected, the maximum speed limit is reduced to 50 km/h for instance.

This is at the moment an acute challenge in countries which have otherwise among the best records in road safety, such as Sweden and Finland.

Risk factor under these circumstances is hundredth of time higher than in "normal conditions" (from 0.3 % to 25% risk in Sweden), there must therefore be a way to detect this.


The question in the pre-commercial procurement tender should remain opened.

It should consist in encouraging ‘solutions to detect impaired driving behaviour and trigger proper actions to prevent dangerous behaviours from impaired drivers.’

## 4.2 The innovation matrix

	Precommercial				Commercial	
	concept	feasibility	prototype	pilot	Integration/ adaptation	Diffusion
Direct procurement						
Cooperative procurement						
Catalytic procurement						

Innovation matrix



There is a strong interest of the local authorities in systems detecting, controlling and preventing impaired driving.

Pre-commercial procurement is therefore a tool to bring on the market solutions to this challenge. It will mainly be up to the market to take up these solutions, by end customers, fleet operators and vehicle manufacturers.

For this purpose, the procuring authority is interested by the catalytic procurement approach.

But through their own public fleet, the public authorities can also stimulate the market and lead by example by equipping their vehicles, fleets or drivers – depending on the winning solution(s). In this role, they would not only support the development of new solutions, they would also play an active role in their deployment on the market.

Overall, their interest is therefore in cooperative procurement, including pre-commercial procurement and possibly in a second phase the commercial procurement of one of the winning solutions.

For this reason, and to support as much as possible the uptake of the solutions by the market, the pre-commercial procurement process would cover the innovation cycle from the concept proposals to the early integration of the solutions in fleets.

Following the publication of the tender and the submission of concept proposals, around five to seven of them will be selected and funded to develop a feasibility study.

Out of these, three to five will be invited to build prototypes to demonstrate their solutions, and two pilots will be funded for the larger scale demonstration of the most promising solutions, allowing each of them to be brought to the market.

The demonstration and larger scale pilot can demonstrate one or the other solutions, possibly both.

However the equipment of a larger part of the public fleets to stimulate the market will be done through a commercial procurement process, in the framework of which the two solutions developed through pre-commercial procurement will most probably compete.

### 4.3 Description of existing or missing exploratory research

Several type of research and products development are currently carried on to prevent impaired driving. Some products are available on the market.

The most common one is the alcolock, which requires the driver to test the rate of alcohol in the blood. If the result is positive (above the legal limit) the vehicle can not be started by this driver. Many public fleets are equipped with this product which is commercially available.

The alcolock does not allow detecting other types of driving impairment or cases when alcohol is consumed while driving.

Some research activities are considering other paths for the detection of driving impairment.

One strand of research is looking at detecting driving behaviours which would correspond to a high probability of driving impairment, such as lane departure detection, etc.

Another strand of research is focusing on the detection of driving impairment via the monitoring of eye movement.

This involves video camera monitoring the eye movement in the vehicle, and detecting patterns translating high probability of driving impairment.

None of these later solutions is available on the market. Nor are they associated to actions to prevent impaired driving.

The pre-commercial procurement process would therefore be aiming at stimulating new approaches, associating detection and reaction to prevent impaired driving, which could be brought to the market.

### 4.4 Main actors

There are multiple actors related to the detection and prevention of impaired driving, which can interact on a market for solutions to address this challenge in various ways.

The end users and main actors on the long term on the market are the vehicle owners. Their interest in the solutions is related to its ability to increase the safety of driving. The main uncertainty is their willingness to pay for an additional feature on their vehicle.

The vehicle manufacturers have also a major role to play. Indeed, the solutions are more likely to be brought to the market if they are offered in the vehicles by the vehicle manufacturer. It is also important that their retailer sell this feature of the vehicles. This is to be taken into account in the consideration of the various possible business models.

The vehicle suppliers must of course cooperate and join the pre-commercial process to test the manufacturing of the products and their insertion in the vehicles.

One of the key challenges is to use the suppliers knowledge during the pre-commercial procurement process while they could be answering the tender

Finally research institutes and technology are expected to play a leading role, together with automotive suppliers, in answering the pre-commercial procurement tender.

### 4.5 Finding a market

The leading authority for the pre-commercial procurement process is the national authority in charge of road safety, or the innovation agency in close cooperation with this authority.

The national level is the proper one to stimulate innovation for a product of interest for all road authorities across Europe.

As road safety is high on the policy agenda of all authorities across Europe, it could be a joint effort of several national road safety authorities.

The intellectual and property rights for such a system, to the extent that it does not involve investment and equipment on the infrastructure side, should entirely stay with the supplier. If it requires roadside equipment or the cooperation with the road infrastructure, some IPR should stay with the procuring authority for the local market.

There is therefore a great incentives for suppliers to bring a solution to this challenge if they secure some funding as part of the pre-commercial procurement process for developing a new solution.

As the interest for suppliers is rather obvious and exist in the current situation, where no solution is yet commercially available, the goal of the pre-commercial procurement process is to encourage new approaches to the challenge and to bring in new actors, as the market as failed to stimulate the traditional ones.

Private transport operators may have a strong interest in the development of solutions to this challenge and join the public process. They can play an important role as potential evaluators, but also as promoters of the scheme.

Beyond this roadmap, pre-commercial procurement addressing challenges likely to be closely related to vehicle technology and road safety can usefully associate private fleet operators. If the exploration of the potential market demonstrate a strong interest from the operators, it is possible for the public authority to consider a direct pre-commercial procurement. This is a potential path if the solution to the challenge consider can bring significant benefits to the operators, who would save on insurance costs and decrease the numbers of days where employees do not work.

## 4.6 Political environment and master plan

The challenge of detecting and preventing impaired driving ranks high on the agenda of all public road authorities. Indeed, road safety ranks very high on the policy agenda across Europe.

The better the road safety record in a country the more important this challenge is , as it is a difficult one to tackle, that automatic enforcement can not easily address, and that education does not answer in an entirely satisfactory way.

The European Union had set the objective of halving the number of road fatalities by 2010. This objective has not been reached, though substantial progresses have been made. A new European road safety action plan is being drafted in 2010 which will confirm the importance of improving the European road safety record.

At national levels, countries such as Sweden with its 'vision zero' have made road safety a priority and are actively working on methods to achieve marginal gains in their road safety record which is already the best in Europe. The Netherlands are on the same path.

Many other countries, though with different road safety records, such as France, are also putting this challenge very high on their political agenda.

Many local authorities are embarking in the draft and implementation of road safety plans. This is for instance the case in Spain.

European and national road safety action plan, completed by local ones, are creating the master plan of which the pre-commercial procurement of solutions to detect and prevent impaired driving would be implemented.

#### **4.7 Evaluation and identification of key partners in the evaluation process**

Who should be associated to the evaluation process?

The evaluation process should be led by the procurer. The challenge is to bring in the evaluation process the expertise and the knowledge of some of the actors, in particular the automotive suppliers.

It could be considered that they would be brought in the first phase to evaluate the concept proposals. Then, once the bidders receive funding to prepare feasibility studies, and later prototypes, the suppliers are not associated to the evaluation process but can join some of the bidding consortia.

This could allow to address the challenge of bringing in new comers but also to use the knowledge of the suppliers, both on the evaluation side, alongside the public procuring authority, and on the supplying side to develop and test prototypes and a first volume of innovative products/solutions.

This would reinforce the validation of the process and therefore its chances to lead to the successful development of marketable solutions.

As there may be very different concept proposed to address this challenge, their need for funding for the feasibility study, the development of prototypes and the demonstration in pilots and on a larger scale may differ greatly. The evaluation should therefore allow differentiating the various levels of funding offered to each individual selected bidder according to the need of the solution proposed.

### **5. Roadmap for the pre-commercial procurement of a pan-European information and booking system for truck parking**

#### **5.1 Objectives and formulating the challenge**

The objective is to stimulate the emergence of a pan-European real-time information and booking system for truck parking in Europe.

This is aimed at facilitating the implementation of the EC directive on driving hours for lorry drivers through a truck parking system.

This system should allow truck drivers to know where there are parking facilities available, what are the services offered on each parking site and to book parking slots.

The service should at least be available on the transeuropean road network and have the capacity to be extended to further part of the European road network.

The service should be accessible to the largest possible number of truck drivers and transport operators across Europe/

The multiplicity of parking operators, of road operators, road authorities, and information system on the European network creates a situation where hardly any actor apart from the public authority is in a position to take the lead in providing this service.

It is interesting, for the purpose of designing this roadmap, that the challenge and the questions are very similar to related challenge also currently considered in some countries.

For instance, it is rather similar to the challenge of creating urban, regional, and probably above all national information and booking parking system for private vehicles. The creation of a common information system on parking is for instance considered in the Netherlands.

The challenges of bringing together various operators, authorities and systems is close, as far as the formulation of the challenge is concerned, to the challenge related to truck parking. Only the panEuropean dimension does not appear for the creation of such system at national level.

Obviously, if such a system was to be considered at the European level, it would also share this issue with the challenge of truck parking. However in this case the complexity of a pan European system would be much greater than for truck parking.

## 5.2 The innovation matrix

	Precommercial				Commercial	
	concept	feasibility	prototype	pilot	Integration/ adaptation	Diffusion
Direct procurement						
Cooperative procurement						
Catalytic procurement						

Innovation matrix

←————→

The public authorities have a strong interest in stimulating the provision of an answer to the challenge of truck parking. However, they do not have, most probably, the mission of managing the system once it will be running.

For this reason one should consider that a catalytic pre-commercial procurement process should be considered to address this challenge.

The pre-commercial procurement process should lead to a pilot demonstration of the solution, probably on a smaller scale than what is required for the full system. The pilot demonstration can be limited to a few European countries (2-3) or even to neighbouring regions from several countries.

During the preparation phase, the option to consider several pilots with different systems in different regions of Europe could be considered to stimulate competition.

If again one considers the creation of a single parking information system at the national level, catalytic procurement is also likely to be the preferred approach. The pre-commercial procurement process would also involve pilot demonstrations.

### **5.3 Description of existing or missing exploratory research**

Information or booking systems as such are available or nearly available.

The missing research consists rather in the challenge of integrating different information systems across countries and between various types of operators. The great diversity of operators is a challenge for this purpose.

Various research activities may be needed depending on the type of solutions considered. For instance detection of parking occupancy to provide real time accurate information can be done through various technologies.

The development of cooperative systems applications are also options for this type of system.

### **5.4 Main actors**

The actors are numerous and heterogeneous, which represents a significant challenge for the deployment of such system.

Road authorities are key actors. They are local, regional and national road authorities involved in the management of the road network considered. They are also the same authorities in their role of regulators with varying competencies according to the segment of the network considered or according to the countries.

Parking operators, sometimes coupled with gas station managers, are a second important group of actors.

Their cooperation is important, though not essential depending on the solutions proposed, for the provision of the information.

Information and service providers are key actors which are expected to develop business models allowing the long term financial sustainability of the solutions offered.

Finally transport operators and users are key as users of the system.

In the case of a national information parking system, local authorities are additional actors as their parking policies are key elements of their mobility policies. They have therefore a strong interest in the communication of the correct information on parking for the efficient implementation of their policies.

## 5.5 Finding a market

The procurer should ideally be representative of the key road operators and public authorities which have the strongest interest in providing a comprehensive, efficient and financially sustainable solution to the challenge of truck parking across Europe. As the cross border aspect of the system is essential, it should therefore be a joint procurement exercise.

Regarding a national database on parking, local authorities may be able to be themselves jointly procurers to bring about the solution. Alternatively, the pre-commercial procurement process could be managed by the national authority while other public authorities, including local authorities, would buy the information and make it available to the users of their mobility network. In this case, catalytic pre-commercial procurement could be considered for parking information.

The IPR should be left to the suppliers to support their business case. However, the requirements of the pre-commercial procurement process, should ensure that the procurer(s) is as little as possible locked in a technology and that upgrades of the system remain independent from the supplier. The system should be opened enough to allow upgrade from other suppliers and to provide tools to migrate with more advanced technologies in the future (from satellite navigation only to more diversified communication environment for instance).

## 5.6 Political environment and master plan

### **European regulations foresee strict rules on resting time for truck drivers.**

A further growth of heavy goods vehicle (HGV) traffic of around 50 % is predicted until 2020. The enforcement of driving and the resting times for truck drivers is important for road safety.

There are an estimated lack of tens of thousands of truck parking slots across Europe to answer to the current demand and absorb the expected growth of traffic.

The situation is very unequal between the Member States, as some have serious shortage of parking spaces and other have over capacities.

Experience and studies show that when they do not find places in parking areas, drivers tend to park on dangerous and not designated areas when they are not exceeding their maximum driving time.

The challenge related to truck parking is therefore related to several major policy objectives and initiatives at the European level.

It is related to the objective of the European Union in terms of road safety. It is also related to the efficient implementation of truck drivers driving time. Finally, this is a challenge related to the future challenge of the EU to cope with the expected growth of traffic volumes.

## 5.7 Evaluation and identification of key partners in the evaluation process

The key partners in the evaluation process should mainly represent two groups of stakeholders, i.e. the road authorities and the transport operators.

Evaluators representing the road authorities can assess that the solution suggested by the bidders does answer the challenge and offer reliable prospects of being implemented on the networks in the future.

The transport operators can validate part of the business plan, assessing whether the solutions considered answer the need of the drivers and of the operators. They can therefore contribute to confirm or not whether the solutions considered would be likely to find a market.

Business experts can also validate further the business plans which could emerge from the various solutions developed in the answers to the pre-commercial procurement process.

## 6. Towards a roadmap for the pre-commercial procurement of cooperative mobility solutions

One of the major challenges for the ITS sector consists of preparing, promoting and accelerating the deployment of cooperative systems.

The potential of pre-commercial procurement to support this goal must be considered carefully. The challenge in this case is to assess how pre-commercial procurement can be used to trigger solutions involving cooperative mobility to address mobility problems. Since a pre-commercial procurement process is expected to be most useful when it remains as technology neutral as possible, the challenge of using PCP to support cooperative mobility can not be answered easily.

A careful assessment of current research and activities on cooperative systems shows that there must be enough innovation to develop cooperative mobility applications answering a specific mobility challenge to go through pre-commercial procurement. Possible approaches require that the desire for cooperative mobility solutions be encouraged in the tender document. This could be done by formulating the challenge in a way that encourages cooperative mobility. It could also be done through requirements published with the tender.

The requirements encouraging cooperative mobility solutions could be written in different ways:

- they could specify that the solutions proposed in answering the call must be cooperative. This assumes that a definition of cooperative mobility is provided in the requirements. This definition could focus on the cooperation between actors via an exchange of data rather than technology. In this case it would specify that the solution should rely on the exchange of data between at least two travellers/vehicles or between travellers/vehicles and the infrastructure and that there should be a full cycle of data exchange with data sent to the first originator of the data in reaction to the data received.
- they could also specify that the solution should be complementary and fit into a broader architecture relying on cooperative systems, for legacy reasons for instance.

Further work is required to attempt to define if and how a pre-commercial procurement process, and especially a tender, can be designed to encourage cooperative mobility solutions.

## **7. Policy recommendations on the use of pre-commercial procurement in transport and in particular for Intelligent Transport Systems**

The iCars thematic group on pre-commercial procurement has carried out an extensive overview of the potential of pre-commercial procurement for Intelligent Transport Systems. This work has been done through events and a large number of contacts with procurers, PCP experts and ITS experts. It has highlighted several challenges related to the pre-commercial procurement of ITS which are not parts of roadmaps.

For this reason, some recommendations, mainly elaborated for the European policy level, have been formulated and form part of the conclusion of iCars' work on pre-commercial procurement.

### **7.1 Overcoming mixed messages related to legal uncertainty and pre-commercial procurement**

Concerns have been expressed by various institutions about the legal validity of some pre-commercial procurement processes. Two main concerns seem to emerge. The first one relates to the real possibility of remaining outside the scope of the procurement directive with pre-commercial procurement. This has sometimes been challenged by the persons with whom we have been in discussion. Because it is also possible to procure innovation within the framework of the procurement directives, it is likely that a risk-averse public administration will be tempted to choose what they perceive to be safer legal options and avoid pre-commercial procurement, even if it is argued to be better fitted in some cases to help them reach their objectives.

A second element of legal uncertainty is related to the amount of innovation required to qualify as a pre-commercial procurement process and fall outside the scope of the procurement directives. This amount was debated between experts during the meeting of the iCars thematic group. It was also debated how much organisational innovation could be considered as the innovative part of the solutions provided to answer a pre-commercial procurement process. This is important because in many of the cases considered in relation to intelligent transport systems, there is as much organisational innovation as technical innovation required, and sometimes even more.

Finally, there was much debate about the extent to which transitional technologies, i.e. the use of technologies applied to another sector but applied to the transport sector to provide an innovative answer to the challenges set, can also be considered to be innovative solutions. No clear conclusions were reached.

For these reasons as well, public authorities may resist the temptation to resort to pre-commercial procurement.

It would therefore be extremely useful for the EC to release legal arguments and further information regarding the legal aspects of pre-commercial procurement. It would also be useful to publicise any legal decision taken in Europe validating pre-commercial procurement processes.

## **7.2 Overview of the procurement of innovation in the transport sector**

The European Commission has released a document on the procurement of innovation in Europe.

A similar document focusing on the transport sector, including several well developed concrete examples of the procurement of innovation in transport, would be most welcome. It should aim at providing an overview of the various processes and legal tools available for funding innovation in Europe. It should also provide elements to establish comparisons between these possible processes and explain in what situation and for what purpose one process (pre-commercial procurement, lead market, etc.) can be preferred to another?

This would greatly help communication on this topic with transport authorities in Europe and experts from the ITS sector. iCars probably constitutes a first small step in this direction.

## **7.3 Increasing awareness and training public authorities**

Beyond the iCars thematic network, further efforts at the European level are required to promote pre-commercial procurement in the transport sector. The opening of a call for proposal as part of the FP8 work programme to fund pre-commercial procurement processes is likely to significantly contribute to this. However, beyond this, training public administration, at least at the national level, and dedicated communication efforts towards public actors and experts in the sector are much needed.

The experts and public authorities contacted in the framework of iCards often expressed concerns about the fact that in spite of their personal convictions and interest in PCP, it would be very difficult for them to convince their institutions to use PCP because of the lack of knowledge. Further European communication efforts in this direction would certainly help.

## 8. Conclusion

This document illustrates the challenges of implementing pre-commercial procurement in the ITS sector. It does so by describing the various questions and challenges to be considered by the procuring authority while embarking on a pre-commercial procurement process. Questions and challenges related to all phases and aspects of pre-commercial procurement are addressed, and the specificities of ITS are considered.

This document then illustrates how these questions can be concretely addressed with the example of three possible pre-commercial procurement tenders related to ITS.

The last two chapters open the way towards further work on pre-commercial procurement in the transport sector. The challenges related to using pre-commercial procurement to support the development and deployment of cooperative mobility are explained with hints on possible paths forward.

Finally, as a result of the intensive exchanges which have taken place in the iCars thematic network on this topic, some recommendations have been formulated about further supporting and spreading information about pre-commercial procurement.