

SAFESPOT INTEGRATED PROJECT - IST-4-026963-IP

DELIVERABLE



SP6 - BLADE - Business models, Legal Aspects, and Deployment

Consolidated recommendations dealing with risks and legal aspects

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Abbreviation List

ADAS	Advanced Driver Assistance System
B&SM	Business & Service Model
BSA	Basic Set of Applications
C2C	Car to Car Consortium
CALM	Communications access for land mobiles
CBA	Cost Benefit Analysis
COOPERS	Cooperative Systems for Intelligent Road Safety
CS	Cooperative Systems
CVIS	Cooperative Vehicle Infrastructure Systems
EC	European Commission
EDPS	European Data Protection Supervisor
EDR	Electronic Data Recorder
EMC	Electromagnetic Compatibiliy
FOT	Field Operational Test
HMI	Human Machine Interface
ICT	Information and Communication Technologies
IR	InfraRed
ITS	Intelligent Transportation Systems
LDM	Local Dynamic Map
OEM	Original Equipment Manufacturer
OPA	Open Platform Alliance
PR	Public Relation
RAID	Risk Analysis of ITS Deployment
S	Strategy
SMA	Safety Margin Assistant
SP	Sub-project
T	Task (as defined in section 1.4)
V2I	Vehicle to Infrastructure
V2V	Vehicle to Vehicle
VANET	Vehicular Ad-Hoc Network
WG	Working Group
WP	Work Package

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EXECUTIVE SUMMARY

This deliverable contains the final recommendations for dealing with risks and legal aspects in the different deployment phases for SAFESPOT. The deliverable consists of two parts, one part (chapter 2) discusses external developments which influence the SAFESPOT recommendations from D6.4.5 – “Preliminary recommendations dealing with risks and legal aspects”. The second part (chapter 3 and 4) discusses the recommendations formulated in D6.4.5 as preliminary and checks the actual status of these recommendations.

The external influences that are discussed are the ITS Action plan, WG on eSecurity, the European Data Privacy Supervisor statement, the work done by ETSI/CEN/ISO on standardisation, the EasyWay initiative, the white paper for deployment and HMI standardisation. These aspects are described in detail before going into the preliminary recommendations.

The preliminary recommendations, which are grouped in 13 strategies, are consolidated and finalised based on findings both inside and outside SAFESPOT. For recommendations that have changed (compared to the preliminary) an explanation is given. Furthermore the actors involved in the strategies (and the corresponding arenas) are filled in and named where-ever possible.

The last section of the deliverable discusses the next step in deployment, FOT's, in more detail showing the interesting recommendations that need to be taken into account for research purposes when FOT's are considered.

1. Introduction

This deliverable consolidates the recommendations given halfway during the SAFESPOT project in the report D6.4.5 – “Preliminary recommendations dealing with risks and legal aspects”. This consolidated report incorporates the progress made within SAFESPOT and especially BLADE over the last 2 years and verifies the validity of the previously given recommendations.

1.1. Innovation and Contribution to the SAFESPOT Objectives

Within the last 2 years the EC-projects on cooperative systems have shown a tremendous progress and demonstrated the potential of data communication between vehicles and infrastructure with respect to traffic efficiency and road safety. This progress in development is put next to the recommendations we proposed from earlier stages in the SAFESPOT project and is combined together with the progress made within the research activities of SP6 BLADE. This combination results in a more realistic (less theoretical) and reliable set of recommendations for deploying SAFESPOT.

Part of this deliverable is a review of the decision making process and more specifically the stakeholders involved within the various arena's. Based on the progress made on various levels (not only within SAFESPOT) more detail can be added with respect to the stakeholders in order to get a better understanding of the options.

1.2. Methodology

This deliverable continues to build on the methodology used in D6.4.5. In other words it checks and verifies what aspects as discussed in D6.4.5 have already been taken into account. The basis for this will be the preliminary recommendations for which the status is checked. As input for the check developments from the BLADE sub-project as well as the other sub-projects from the SAFESPOT project are used.

As mentioned before, other activities have already been identified which are of high importance for the recommendations given in D6.4.5. This so-called ‘field of external influences’, at least from a SAFESPOT-project perspective, are taken into account in this deliverable as well. The external influences are generated from the following activities:

- ITS Action plan
- eSecurity WG
- European Data Protection Supervisor
- EasyWay Initiative
- Open Platform Architecture initiative
- iCars WP2 awareness activities
- ETSI/CEN/ISO standardisation activities
- The common white paper on cooperative systems
- Human Machine Interface Standards

All these sources serve as input and the actual status of the recommendations. For every recommendation the necessity for keeping it is checked based on the following aspects:

- 1) Aspects dealt with within the SAFESPOT project
- 2) External developments which influence the recommendation
- 3) Developments that make the recommendation outdated
- 4) Currently work is being done on the recommendation
- 5) If none of the above applies, the recommendation is kept as it is

The analysis of the results is presented in a similar fashion as compared to D6.4.5. For the recommendations that have changed compared to D6.4.5 a short explanation is given. First the process recommendations will be given, followed by a short discussion on the actual involved stakeholders. The content recommendations are next.

Due to the large influence of the external developments these will be discussed in a chapter before the discussion of the actual recommendations.

For the actual recommendations the so-called deployment issues are on the agenda of the arenas. The setting of the arenas, which consist of the players (actors) and the topics that are to be discussed (agenda), are maintained throughout the process and are part of the process management.

The arenas determine the structure of the decision-making process needed for further deployment and development. The identified arenas are:

- 'Steering committee' arena
- Community of Interest arena
- Technical arena
- Business Planning arena
- Legal arena
- Deployment arena

Within every arena one or more 'strategies' have been identified for dealing with deployment challenges. The results that are described in this deliverable are:

1. Changes in the recommendations for how to deal with mitigation strategies which were earlier defined in WP6.4.3 and reported in D6.4.5.
2. Changes in the recommendations for the decision-making process in SAFESPOT in terms of responsibilities for each of the identified arenas.
3. Changes in the identification of the 'political' choices and knowledge gaps, which are both within and outside the scope of SAFESPOT (including the consequences).

1.3. Deliverable structure

Chapter 2 describes the current developments outside SAFESPOT to identify additional recommendations about issues that are insufficiently addressed or issues for which new insights require a change of the preliminary recommendations.

Chapter 3 performs a consolidation of the process recommendations. The status of the recommendations is identified in terms of progress (to be done, work in progress, solved or no longer relevant).

In chapter 4 the recommendations related to content and issues are discussed.

In chapter 5 the consequences of the changed recommendations are given for the next steps which are taken for deployment.

In the last chapter some overall conclusions are described based on importance for SAFESPOT or urgency to be solved if the next step needs to be taken.

This report D6.4.6 – “Consolidated recommendations dealing with risks and legal aspects” only focuses on the consolidation of the recommendations. For background information on the arena’s, the strategies and the methodological procedures on how these have been developed, we refer to the D6.4.5 report.

2. Field of external influences

2.1. Introduction

This chapter describes the current developments outside SAFESPOT to identify additional recommendations about issues that are insufficiently addressed or issues for which new insights require a change of the preliminary recommendations.

The figure below shows the impact of the various external influences on the different strategies. In the following chapters the influence is described in more detail. The aspects that are discussed are the following:

- ITS Action plan and proposal Directive
- eSecurity WG
- European Data Protection Supervisor / WP29
- EasyWay Initiative
- Open Platform Architecture initiative
- iCars awareness raising activities
- ETSI/CEN/ISO standardisation activities
- The Deployment white paper on cooperative systems (COOPERS, CVIS and SAFESPOT)
- Human Machine Interface Standards

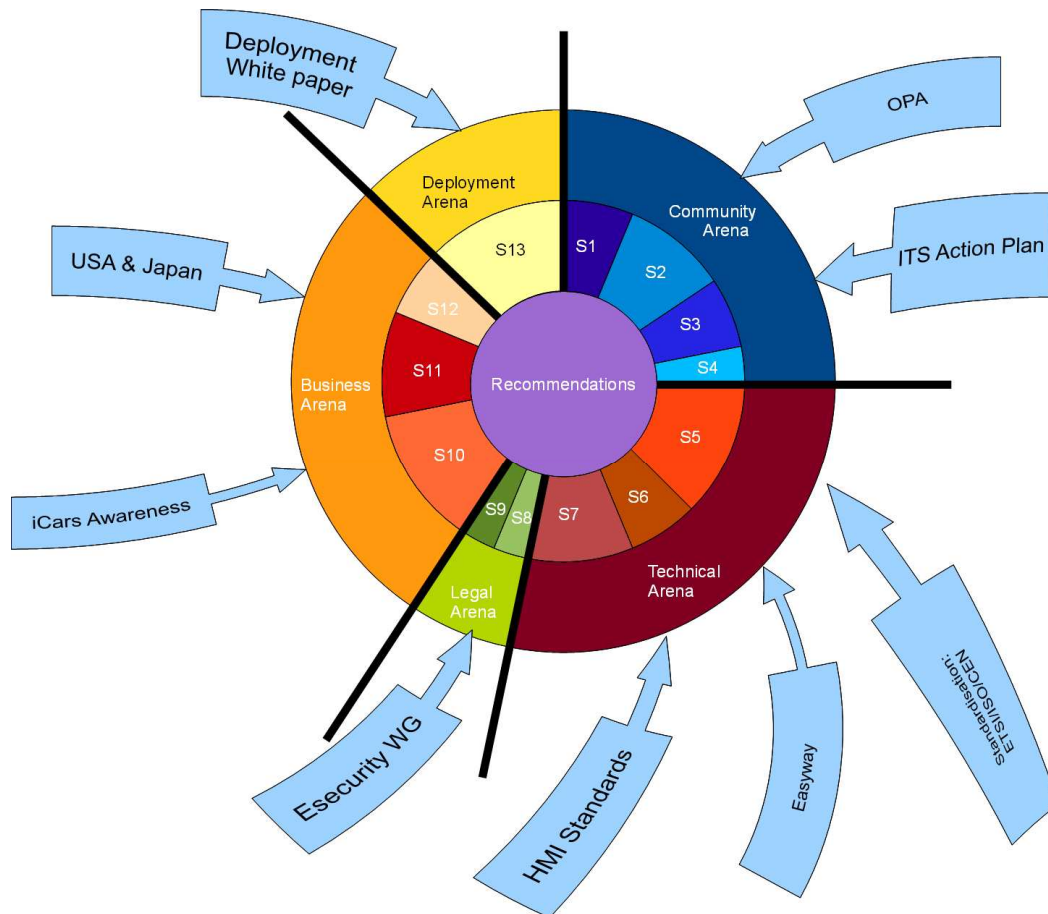


Figure 2.1: Field of external influences on recommendations (looking at arenas and strategies)

For two aspects there is an overlap with work performed within the technical SP's of SAFESPOT, privacy and HMI Standards. These aspects have been taken into account within SAFESPOT, but were not part of the core research activities. They are presented here to show the influence of these aspects on the recommendations.

2.2. ITS Action plan

The main policy objectives arising from these challenges are for transport and travel to become:

- cleaner,
- more efficient, including energy efficient (COM, 2006),
- safer and more secure.

It is however clear, that conventional approaches such as the development of new infrastructure, will not give the necessary results on the timescales required by the magnitude of these challenges. Innovative solutions are clearly needed if we are going to achieve the rapid progress demanded by the urgency of the problems at hand. It is high time for Intelligent Transport Systems to play their due role in enabling tangible results to emerge.

This Action Plan aims to accelerate and coordinate the deployment of Intelligent Transport Systems (ITS) in road transport, including interfaces with other transport modes.

The Action Plan outlines six priority areas for action. For each area a set of specific actions and a clear timetable are identified. Fulfilling them by setting a framework to define procedures and specification will call for the mobilisation of Member States and other stakeholders.

Finally, this Action Plan will help to combine the resources and instruments available to deliver a substantial added value for the European Union.

- Action Area 1: Optimal use of road, traffic and travel data
- Action Area 2: Continuity of traffic and freight management ITS services on European transport corridors and in conurbations
- Action Area 3: Road safety and security
- Action Area 4: Integration of the vehicle into the transport infrastructure
- Action Area 5: Data security and protection, and liability issues
- Action Area 6: European ITS cooperation and coordination

The ITS Action Plan is accompanied by a proposal for a directive "laying down the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other transport modes". The general objective of this proposal is to create the conditions and, in particular, to put in place the necessary mechanisms to foster the uptake of Intelligent Transport Systems (ITS) services and applications for road transport and their interfaces with other modes of transport in order to have ITS contributing at its full potential towards the various EU policies.

In short, the Commission proposal foresaw that the Member States take the necessary measures for a coordinated deployment and use of interoperable ITS applications and services within the Union. To this end, the Commission proposed to

adopt specifications through the so called comitology procedure (regulatory procedure with scrutiny) which might also entail obligations for Member States to deploy ITS applications and services.

Furthermore the proposal foresaw the establishment of an ITS Advisory Group composed of high level executives representing stakeholders from the most important areas (ITS service providers, associations of users, transport and facilities operators, manufacturing industry, social partners, professional associations) and which shall advise the Commission on business and technical aspects of the deployment and use of ITS in the European Union. This ITS Advisory Group will collect and compile input from existing fora such as the eSafety Forum, ERTRAC etc.

The European Parliament approved with amendments this draft ITS directive. They have called on the Commission to make a number of improvements to their proposals:

- to enhance compatibility between ITS systems and ensuring "backward compatibility" with previous applications and systems;
- to increase the focus on vulnerable road users (pedestrians, cyclists, motorcyclists, disabled people and people with limited mobility);
- to ensure respect for data protection and privacy: collection, storage and processing of personal data must be carried out in accordance with EU rules;
- to clarify liability issues by involving experts and stakeholders.

In May 2010 the Council adopted its position at first reading on a proposal for this directive. The Council agreed on a two-step approach paving the way for swift introduction of ITS through EU legislation: first, the Commission adopts the necessary specifications for the ITS applications and services concerned; then, within 12 months and, where appropriate, after an impact assessment, the Commission presents a proposal for deployment of those ITS to the European Parliament and the Council, which will jointly decide for or against the proposal. In any case, member states will have the final say on whether or not to deploy an ITS application or service on their territory. However, if they do so, they must respect the specifications adopted under the directive. If the European Parliament accepts the Council's position (which is due to take place in June 2010), then the directive will be considered adopted in this form. This adoption shows a reasonable step in the direction of standardisation from an EC-perspective and is the vision needed to stimulate the deployment of ITS applications in general, but moreover needed for the deployment of cooperative systems.

2.3. eSecurity WG

The eSecurity Working Group was set up within the eSafetyForum as a discussion platform involving all stakeholders with two objectives: to discuss vulnerability aspects of electronics and communications in road transport while taking into account existing practice and emerging Research and Technology Development (RTD) initiatives, and to agree on recommendations to improve or eliminate the vulnerabilities. The focus of the activities was not only on Independent Vehicle-based Electronics but also on Interactive Systems (dealing with overall applications involving vehicles communicating with external systems, for services such as road charging and Intelligent Transport Systems). The following recommendations are made by the eSecurity working group:

1. Ensure separation between independent vehicle-based systems and interactive systems. Vehicle based systems should remain under the responsibility of the OEMs and should not be affected by interactive systems
2. Investigate liability issues of applications beyond informing systems (systems that have an immediate impact on driving). Further research work is needed to understand and monitor these effects
3. Harmonise legal measures in place within Member States concerning improvement of electronic security (e.g. regulations on manipulation of mileage). Today inconsistencies among legal framework within the Member States exist.
4. Address security issues raised by specific applications. In particular define evaluation criteria and methods which stakeholders can use in their decision process.
5. Undertake further work to identify further recommendations for a privacy by design approach.
6. Maintain further work related to cooperative systems. In particular,
 - 6.1 Ensure necessary standardisation and harmonisation of security solutions.
 - 6.2 Validate security and privacy mechanisms for the first generation of cooperative systems in field operational trials.
 - 6.3 Undertake research activities on security and privacy issues for the next generation of cooperative systems.

2.4. European Data Protection Supervisor/WP29

Unresolved issues in privacy and data protection have been identified as potential obstacle for promoting SAFESPOT systems. Applications and services may be based on the collection, processing and exchange of a wide variety of data, both from public and private sources. Their deployment may also rely on the use of geo-localisation technologies, such as satellite-positioning. As such, SAFESPOT systems and services constitute a "(personal) data-intensive area" and raise a number of privacy and data protection issues that should be carefully addressed. Recent documents from the EDPS (European Data Protection Supervisor) and WP 29 highlight the issues at stake and formulate recommendations to help prevent and overcome data protection concerns.

- Clarification of responsibilities: it is crucial to clarify the roles of the different actors involved in SAFESPOT in order to identify who will bear the responsibility of ensuring that systems work properly from a data protection perspective (who is the data controller?)
- A 'privacy by design' approach should be adopted at an early stage of the design of SAFESPOT systems, to define the architecture, operation and management of the applications and systems.
- Privacy by design' should be encouraged at all stages of the processes and in all forms of the processes:
 - o at an organisational level, privacy should be considered in the definition of the necessary procedures for data exchange between all relevant points of exchange - this may have direct impact on the type of exchanged and on which data are exchanged,
 - o privacy and security requirements should be incorporated within standards, best practices, technical specifications, and systems,

Issues that must be specifically addressed in the design of the applications and the architecture of the systems include the following:

- Who is the data controller (who is responsible for compliance with data protection rules)?
- Is there a valid legal ground for processing (consent, legal obligation, etc.)
- Personal data should be processed for specified purposes (purpose limitation principle)
- Only necessary personal data should be used and processing activities should be proportionate to the purposes (data minimisation and proportionality principle)
- Use anonymous/aggregated data insofar (and as soon) as possible
- The person concerned by the data considered should be able to exercise control over personal information concerning them, be informed of their rights, express prior consent, limits its use to purposes. etc.(transparency)
- Security of information (integrity and confidentiality)

To ensure the workability of SAFESPOT applications and services across Europe there is a need for a coherent harmonisation of data processes at EU level. In line with the recommendation of the EDPS in relation to ITS in general, developing pan-European standard contracts to ensure that SAFESPOT services offer the same data protection safeguards across Europe, and in particular that information provided to users is sufficiently clear about the specific features used, the impact on

the use of specific technologies on the protection of their data, and how they can exercise their rights.

2.5. EasyWay Initiative

EasyWay is a project aiming at the large-scale deployment of European ITS services on the Trans-European Road Network, receiving financial support from the European Commission (DG-TREN), with road operators as the primary partners. A Task Force on the issue of cooperative systems has been established with different work-packages as shown in the figure on the next page.

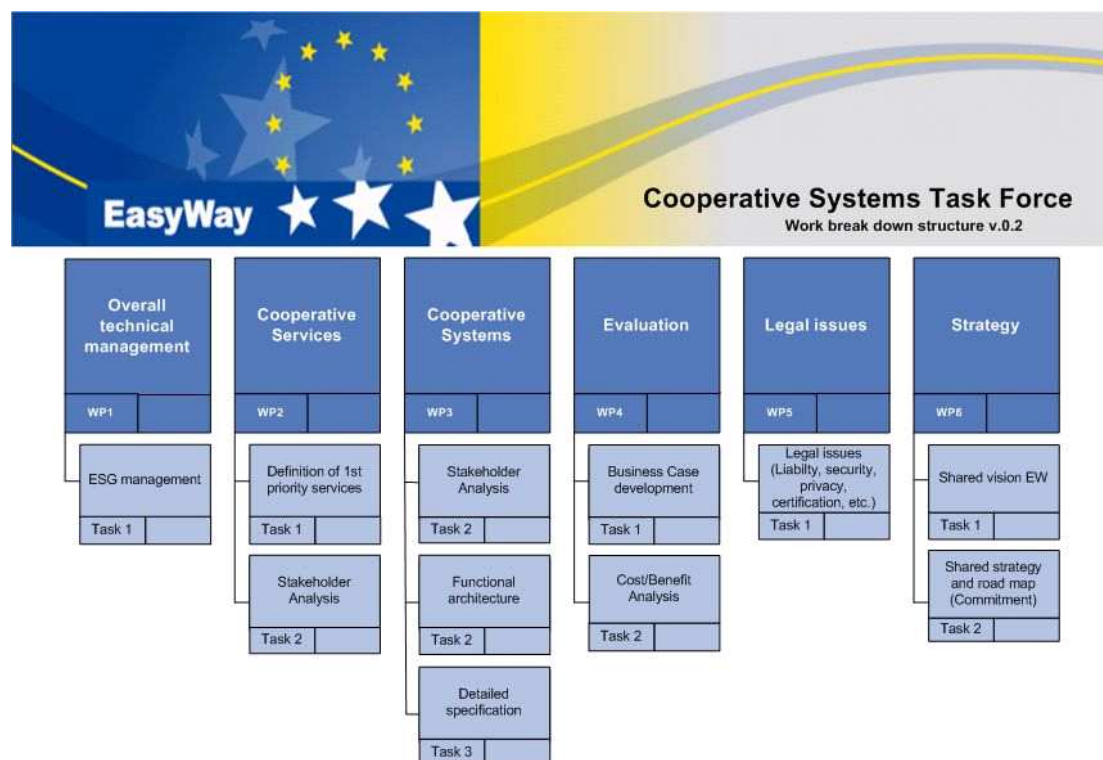


Figure 2.2: Workpackages from the EasyWay Cooperative Systems Task Force

During the 2nd EasyWay Annual Forum in Vienna 2009, a workshop was organised on cooperative systems. As a result, Paul van der Kroon initiated an informal "Chicken and egg" group for preparing roadmaps for cooperative system deployment on a strategic level, aiming towards:

- A common vision covering the importance of CS for each stakeholder
- A framework for a strategy towards a large scale implementation of CS
- Business models covering the interests of all strategic stakeholders for the implementation of the various cooperative services

It is really important to note that EasyWay is a deployment project of almost all European road operators with its duration extending to only 2013. The large-scale deployment of real cooperative systems is not expected to take place within this time frame. However, the EasyWay project covering "all" European road operators in a time, where major decisions are being made concerning cooperative systems, provides an optimal platform for common road operator agreement and support to the large-scale deployment of the cooperative systems regarded as the best ones

from the road operator point of view. The future work should be focused on such cooperative systems mature enough for such deployment. These are the priority applications for EasyWay, and deployment guidelines for these need to be developed as soon as possible to facilitate the pilot deployments and their evaluations already within EasyWay. At the same time, the large scale deployment of cooperative systems requires that we need to agree among the EasyWay partners on the generic issues relevant for all cooperative systems such as the roles and responsibilities of different stakeholders, and the road operators' vision and strategy for cooperative system deployment.

The task force must in the start of its work agree on the 1st priority systems, and especially the new systems that should be piloted and assessed within EasyWay Phases II and III. Action plans for these 1st priority systems need to be fixed early on during Phase II. This action has already been undertaken via the cooperation of the PRE.DRIVE C2X and EasyWay projects. SAFESPOT contributed thanks to the involvement of common partners e.g. TNO, CRF.

2.6. Open Platform Architecture initiative

Below, the invitation to the discussion on the “Cooperative Mobility- Open Platform Alliance” is included. At the 1st of June a number of organisations were invited to participate in the formation of an alliance directed to the further development of cooperative systems. A number of organisations expressed their interest and contributions. It is expected that in the near future this alliance will release an official statement on objectives and working structure. The terms of reference for this initiative will be defined by the membership during the initial phase. The initial statement on vision, stakeholders and objectives is listed below. There is no overall SAFESPOT position statement on OPA, however individual partners have already shown interest in this initiative.

Vision statement: An open, standards based framework for safe, efficient and environmentally friendly cooperative mobility enabled by vehicle-infrastructure and vehicle-vehicle communication using open protocols and open interfaces for service innovation.

The proposed “Cooperative Mobility- Open Platform Alliance” would give substance to this vision. With the goal to promote interoperability amongst future implementations of cooperative systems and coherence in supporting R&D, standardisation and commercial activities, the alliance will foster dialogue and convergence amongst following groups:

- *cooperative users: focus on the needs and requirements from a user’s perspective, public policy, liability, data privacy and security, business and operational models etc;*
- *application developers: focus on harmonised development of applications to enable widespread deployment of consistent and interoperable services across numerous environments;*
- *core technologies: promote European convergence on enabling technologies for communication, data exchange protocols, application APIs etc.;*
- *validation community: supporting the transition from demonstration to deployment by building on cooperative ITS trials and validation activities.*

The initial objectives of the Cooperative Mobility - Open Platform Alliance include:

- *represent, promote and publicise cooperative ITS;*
- *support activities promoting convergence towards interoperability;*
- *support coordinated approach on European and national level to development of the cooperative technologies and services;*
- *support a coordinated approach to standardisation, helping define what should be standardised and in which body;*
- *establish a framework for certification of products and services, including privacy and security aspects;*
- *support business validation, including organisational and business models;*
- *investigate legal aspects such as a framework for liability and responsibility;*
- *liaison with relevant bodies and platforms.*

2.7. iCars awareness raising activities

Recommendations about awareness raising activities are aiming at bringing to a quicker and more intense take-up of ITS and to increasing consumer demand for ITS products.

As a general recommendation for all stakeholders and awareness actions: the WP2 of the iCars study (EC 7th Framework program), after assessing all data in the Inventory of methods (studies/materials and questionnaire-based study results) came to understand that in most cases the stakeholders involved in ITS organise an impressive number of information and awareness actions, but that *generally they do not evaluate the effects of these actions*. The evaluation of such activities will increase the potential for understanding user acceptance and willingness-to-pay for ITS systems and are therefore very valuable in the deployment process.

2.8. ETSI/CEN/ISO standardisation activities

Under the standardisation mandate M/453, the EC has issued a “Standardisation mandate addressed to CEN, CENELEC and ETSI in the field of information and communication technologies to support the interoperability of co-operative systems for intelligent transport systems in the European Community” with the aim to prepare a coherent set of standards, specifications and guidelines to support European Community wide implementation and deployment of Co-operative ITS systems. A split of work among the above mentioned institutions has not been achieved yet.

Furthermore, in the field of telecommunication the CALM family of standards (Wide area communications/protocols and interfaces) is currently under development. Some areas have already been published as standard while others are still being developed. A full overview can be found at <http://www.isotc204wg16.org/> and www.iso.org (TC204/WG16).

A number of steps are (being) made in the standardisation of cooperative vehicle systems in Europe. The European Commission has issued a Standardisation Mandate (M/453) on cooperative ITS 6 October 2009 (EC, 2009). The organisations dealing with standardisation with relation to cooperative systems in Europe are ETSI and CEN (and ISO on world level). They divided the standardisation tasks and cooperate and coordinate the standardisation. The preliminary work items are Classification and management of ITS applications in a global context, Co-operative system application messages, protocols and profiles, ITS application requirements for automatic selection of communication interfaces, Definition of LDM concept (Schade, feb 2010). The planning is to finalise this in July 2012 (Hess, 2010).

An important standard for communication with vehicles is CALM (Communications access for land mobiles). CALM is an initiative by the ISO TC 204/Working Group 16 (2008) to define a set of wireless communication protocols and air interfaces for a variety of communication scenarios spanning multiple modes of communications and multiple methods of transmissions in Intelligent Transportation System (ITS). The CALM standard is still work in progress. Therefore, large scale implementations of the standard do not yet exist. CVIS is a project funded by the EC in the sixth framework program (FP6). The aim of the project is to develop and implement a communication infrastructure based on the CALM architecture. CVIS will implement

CALM M5, 2G/3G and IR as communication media. The implementation will be tested at several test locations across Europe with a wide range of ITS applications.

Standards should provide both a structure that ensures interoperability, as well as flexibility to provide different applications and communication technologies. The focus of the recommendations is on ensuring modularity and flexibility. This has been addressed on the level of communication technologies in the CALM standard, but not yet sufficiently on the level of applications. It is therefore recommended to review the CALM standards on modularity and flexibility.

2.9. The common white paper on cooperative systems

This white paper is to create a common basis between the three 6th frameworks IP's, focusing on cooperative systems, providing a vision on issues for the deployment of such systems and recommend actions to be taken by stakeholders. This white paper focuses on the non-technical challenges the deployment of cooperative systems is facing and can be divided into three parts:

- Identification of the challenges
- Actions for stakeholders to overcome the challenges
- Visions on the deployment of cooperative systems

The subjects for deployment are derived from the various sub-projects involved with deployment. The overlap between the subprojects of the 3 IP's, although not anticipated in the beginning, provided a common basis, which lead to the idea of producing this white paper.

The subjects discussed are the following:

- Technology
- Standardisation & Interoperability
- Liability
- User acceptance
- Privacy & Security
- Business "Modelling" & Organisational
- Political
- Deployment & Operation

The actions to overcome the deployment challenges coming from these subjects are for the five main involved stakeholders, knowingly Public authorities, Road operators, OEM's, Suppliers and Service providers. The vision for deployment is presented in the last chapter where the synergies between deployment scenarios for the various projects are projected.

2.10. Human Machine Interface Standards

During the developments of SAFESPOT the HMI has been investigated and tested within SP4 & SP5 (results of the testsites), especially the driver reaction towards this aspect has been evaluated (although developing the HMI was not the core of the research work within SAFESPOT). Since 2002, ISO 15005 till 15008 have been in practice creating a standard for HMI-design. ISO-15005 focuses on:

"This International Standard presents ergonomic principles for the design of the dialogues that take place between the driver of a road vehicle and the vehicle's

transport information and control systems (TICS) while the vehicle is in motion. It also specifies compliance verification conditions for the requirements related to these principles.”

This has been further specified in 2004 for auditory signals in ISO 15006.

ISO 15007 focuses on plan evaluation trials, specify (and install) data capture equipment, and analyse, interpret and report visual-behaviour metrics (standards of measurement).

ISO 15008 is focusing on specific aspects of visibility gives minimum specifications for the image quality and legibility of displays containing dynamic (changeable) visual information presented to the driver of a road vehicle by an on-board transport information and control system (TICS) used while the vehicle is in motion. These specifications are intended to be independent of display technologies, while test methods and measurements for assessing compliance with them have been included where necessary.

These ISO specifications served partly as input for the HMI investigations within SAFESPOT, when continuing the research work further attention needs to be paid to the HMI and the driver reaction.

3. Consolidation of process recommendations

3.1. Introduction

In the preliminary recommendation report (D6.4.5) a separation has been made between two types of recommendations, knowingly:

- Process related commendations
- Content related commendations

This distinction is maintained in this deliverable. The process recommendations are discussed in paragraph 3.2, followed by the conclusions on the deployment process in paragraph 3.3. The content recommendations are discussed in chapter 4.

3.2. Process recommendations

Process recommendations are formulated as proposed decisions. Decisions are either taken or they are not taken. When a decision is labelled with the status 'work in progress' the issue is on the agenda and the stakeholders intend to make the decision. Furthermore whenever it is possible, representatives for the stakeholders are identified in the different arenas.

3.2.1. Strategy 1: Technical (community of interest)

Recommendations (status)

- 1) It is recommended to decide on the total amount of the "without prejudice" restoration fund and contributions of the actors. This is a political choice that can be made based on rough estimates of costs. Therefore this decision does not require further research. (to be done)
- 2) It is recommended to decide on who determines the standards and or certification procedures for the technical specifications. (solved, see also section 2.8)
- 3) It is recommended to decide on who determines the standards on the presentation of information. (to be done)

This strategy deals with the technical risks that are a threat to the deployment process. Important decisions that need to be taken are about standardisation.

The recommendations in this strategy still need to be carried out. A start has been made on the decision who determines standards and certification procedures. CEN, ETSI and ISO all address different aspects of standards and certification procedures in the 'community of interest' arena. These actors have been assigned to the task and divided the work (see section 2.8).

Stakeholders: The standardisation bodies, e.g. ETSI and CEN, for defining standards and the EC providing their mandate.

3.2.2. Strategy.2: Legal (community of interest)

- 4) It is recommended to decide on the type of institutional arrangements (laws, contracts, self regulation) needed to create an efficient organisational architecture. (to be done)
- 5) It is recommended to decide on conditions for data communication/processing/storage from a data protection law perspective. (work in progress)
- 6) It is recommended to decide on feasible allocation of risks and the legal framework to formalize this. (to be done)

This strategy deals with the legal aspects that are a (potential) threat to the deployment process such as liability and privacy issues. Relevant legal aspects will strongly depend on the technical and organisational embedding of a specific system. The institutionalisation, e.g. in terms of legislation or directives, has hardly started in the current phase of creating proof of concept for cooperative systems. All recommendations still need to be carried out. The standardisation activities are a first steps in formalising the institutional context. The data protection guidelines are being used as guidelines in the standardisation process (Schade, 2010). Furthermore the EDPS has formed their opinion on cooperative systems and related data aspects (see section 2.4).

Stakeholders: The stakeholders involved in legislation are the EC and national government for legislation, the standardisation bodies, e.g. ETSI and CEN, for defining standards.

3.2.3. Strategy 3: Deployment (community of interest)

For strategy 3 on the deployment within the community of interest there were no specific decisions addressed on the community of interest level. Decisions and tasks concerning the deployment are addressed in the Deployment Arena (strategy 13). Another important aspect that needs to be mentioned here is the raising of awareness on cooperative systems; this aspect has been addressed in the iCars project (see section 2.7).

However, currently there are in Europe different views on the deployment of cooperative systems. On the one hand there is the car industry view on deployment, which is a traditional product development view. In this view both car industry and road authorities give a list of applications that will together become the BSA (Basic Set of Applications). Short range 802.11p based communication technology is required to guarantee a minimum service level for many critical safety services. Engineers will develop an on-board unit with at least the basic set of applications and this platform will be put on the market. On the other hand there is the ICT service industry view on deployment, which is an information network view. Infotainment applications are the first cooperative applications on the market, based on best effort, not on a guaranteed quality of service. According to this view, end users will accept that the system is not perfect. A platform will emerge on which an end user can get any desired combination of applications, not a bundle or BSA. Rather an 'open' platform like the iPhone as also suggested by Søren Hess, Chairman ETSI TC ITS during the cooperative mobility showcase (Hess, 2010).

Another important aspect that needs to be mentioned here is the raising of awareness on cooperative systems; this aspect has been addressed in the iCars project (see section 2.7).

Stakeholders: The decisions about which of the deployment paths will be followed (or maybe both) will be made at the community of interest level. These are decisions of directors of companies and public authorities to invest in cooperative systems. These decisions will likely be made after the FOT phase based on the results of the coming cooperative FOT's.

3.2.4. Strategy 4: Business planning (community of interest)

- 7) It is recommended to decide on an independent platform (like SAFESPOT) to mediate between the stakeholders. (work in progress)
- 8) It is recommended to decide on long-term support from public authorities. (work in progress)
- 9) It is recommended to decide on investment at an early stage. (to be done)
- 10) It is recommended to decide on amount and contributions to a 'without prejudice' restoration fund'. (to be done)
- 11) It is recommended to decide on the suitable types of institutional arrangements between the providers of the Safespot systems to overcome the lack of legislative backing (laws, contracts, self regulation). (to be done)
- 12) It is recommended to decide whether and how such investments risks should be compensated (or covered). (to be done)
- 13) It is recommended to decide who is responsible for what in case of system failure. (to be done)

This strategy deals with the distribution of benefits, costs, responsibilities and risks between the stakeholders. The progress is made in carrying out the recommended actions.

An independent platform to mediate between stakeholders as was recommended under recommendation 7 called Open Platform Alliance (OPA), is being initialised as a follow-up of the 6th integrated framework project CVIS (see section 2.6). At this moment there is no SAFESPOT position statement on whether this platform contributes to the SAFESPOT objectives. Furthermore a start has been made with the long-term commitment from the public authorities; in more detail the road operators in the EasyWay initiative (see section 2.5).

Stakeholders: Other recommendations still need a more clear specification of a SAFESPOT system and its benefits, before they can to be carried out. The organisations participating in the FOTs anticipated in the 7th framework European projects should provide this clarity.

3.2.5. Strategy 5: Standardisation (technical arena)

- 14) It is recommended to decide on which radiation standard will be used for the communication equipment. Possibly this is an existing standard. (no longer relevant)
- 15) It is recommended to decide on an architecture that is able to cope with a range of applications from technically simple to technically complex. This architecture should be able to cope with the transition from a few simple to many complex applications during the growth phase of the Safespot system deployment. (work in progress)
- 16) It is recommended to decide on which simple applications should be deployed first. (work in progress)
- 17) It is recommended to decide on a standard for the data acquisition. This standard should contain a clear specification of the accuracy and reliability of the detected information. The knowledge that received data meets a standard will simplify the merging of data from different sources. (to be done)
- 18) It is recommended to decide on which task groups are needed to prevent a lack of policy guidelines and legislation on a functional level. It should be defined who should be in the different task groups (to be done)
- 19) It is recommended to decide on which parties should be in a task group that looks at standardisation for the services needed for this system. This should prevent a fragmented service providers' market. (solved)
- 20) It is recommended to decide an information standard to ensure that information is kept up-to-date. This standard can then be used to quantify agreements between infrastructure providers and service providers. (to be done)

This strategy deals with standardisation from the technological perspective. A main issue in the SAFESPOT system design is modularity. A modular system should enable updates with new technologies and/or other components or applications. A modular design also provides the flexibility for the SAFESPOT system to grow from a few applications to a platform of many applications.

A lot of effort is done on standardisation in the 3 IPs on cooperative driving, CVIS, Coopers and SAFESPOT. The CALM standard has been developed (ISO TC 204 WG 16, 2008). However, the focus of the recommendations in this strategy is on standardisation that ensures modularity and flexibility. This has not yet been addressed in the CALM standard. It is therefore recommended to review the CALM standards on modularity and flexibility. See also section 2.8 for the current developments on standardisation.

Stakeholders: The stakeholders involved in standardisation are the engineers from the organisations participating in the three cooperative IPs COOPERS, CVIS and SAFESPOT (car industry, road authorities and operators, ICT and service providers and research institutes). The CALM architecture has been drafted by the task force led by COMeSAFETY to which SAFESPOT participated. The architecture is consolidated in standardisation working groups of ETSI, CEN and ISO.

3.2.6. Strategy 6: Performance/quality (technical arena)

- 21) It is recommended to decide on a way to quantify the quality of the information. This can then be used to determine the level at which a system is operating. If the level is too low this could mean that the system is not useful. (to be done)
- 22) It is recommended to decide if there is a consensus on a common HMI approach that would incorporate the possibility that a warning might be wrong. (to be done)
- 23) It is recommended to decide on which warning obtains which priority. This should incorporate the actual state of the user, environment and vehicle. (to be done)
- 24) It is recommended to decide on how to diagnose system performance. This diagnosis is needed in case of malfunctioning of the system and is expected to be implemented within the boundaries of the existing privacy guidelines and legislation. (to be done)
- 25) It is recommended to decide on which radiation standard will be used for the communication equipment. Possibly this is an existing standard. (no longer relevant)
- 26) It is recommended to decide on a general architecture that is generic enough to cope with a range of applications from technically simple to technically complex. This architecture should be able to cope with the transition from simple to complex applications over time. (work in progress)
- 27) It is recommended to decide on a general architecture. This architecture should be able to cope with future technologies, software updates and compatibility at acceptable costs. (work in progress)
- 28) It is recommended to decide on the phasing sequence for modules user groups and road types. The trends in technology developments should be taken into account in the definition of the phasing. (work in progress)
- 29) It is recommended to decide on what level of driver education is foreseen and acceptable. In addition, a decision has to be made as to how this education should be planned. (to be done)

This strategy deals with decisions on the performance of the system.

The recommendations on the performance related to the flexibility of the architecture are in progress (scalability (15 and 26), updatability (27), since a lot of effort was done by the Car2Car consortium on robust transmissions and fail-safe communication between nodes (e.g. CALM architecture).

Radiation: The recommendation on the radiation of the system is not relevant anymore. Electromagnetic Compatibility (EMC) or radiation standards (e.g. sending power) are a functionality of the (existing) communication standards and radiation is regulated (EMC directive 2004/108/EG).

Other recommendations, e.g. on the quality of the information, the security issues (diagnosis) and the required driver training still need to be carried out.

Stakeholders: The stakeholders required for a good performance are engineers from different organisations to continue the work of the European Integrated Projects.

3.2.7. Strategy 7: User/HMI (technical arena)

- 30) It is recommended to decide if there is consensus on a common HMI approach that will prevent user HMI problems. (to be done)
- 31) It is recommended to decide on which task groups for standardisation are needed to prevent a fragmented service provider market. (to be done)

Both of the recommendations within this strategy still need to be started. There is however a relation with existing HMI standardisation decisions. The specific SAFESPOT decisions still need to be taken into account (see section 2.10).

Stakeholders: This strategy requires, apart from the engineers that make the system work, an FOT organisation to experiment with user acceptance. This has been requested in the work programme from the EC in the 7th Framework call for ICT.

3.2.8. Strategy 8: Legislation (legal arena)

- 32) It is recommended to decide as to the parties who will (preferably) be involved in the operation of SAFESPOT systems in order to identify and address legal barriers and conditions to build an efficient organisational architecture/business model for SAFESPOT-applications (to be done)
- 33) It is recommended to decide on the roles and responsibilities of the involved stakeholders and the need for (and specifications of) pre-agreed performance standards for systems and services. (work in progress)
- 34) It is recommended to decide which Actors in the project will join together to create the lead in developing a business from which the Safespot system will be launched and ran. (work in progress)
- 35) It is recommended to decide if other stakeholders like insurers or reinsurers need to be included in the business model. (solved)

Most recommendations from the legal arena still need to be decided upon. A first step has been made in work package 6.3 on organisational architecture. Concerning the recommendation on including insurers in the B&SM it has been decided that for now their role in the B&SM is unclear (See WP6.6), therefore a decision has been made in that retrospect.

Stakeholders: The main legislative bodies are the EC and national governments they are the important stakeholders for taking the decisions on the above mentioned aspects. Adaptation of laws on liability is for systems like SAFESPOT not an option, since the system is only informing. For systems that will be interfering with the driver, the liability laws most probably will need to be adapted.

3.2.9. Strategy 9: Privacy/ data storage (legal arena)

- 36) It is recommended to decide on the technical side regarding which data need to be communicated and processed; where and for how long it will be stored; (to be done)
- 37) It is recommended to decide who may access the data need to be legally evaluated. (to be done)

The recommendations in this strategy still need to be decided upon in the following phases of the development of the SAFESPOT-concept.

Currently, privacy is considered to be an issue that needs to be taken into account early in the development process. Technical and organisational measures/standards need to be identified/developed and applied in the design of the system/service to guarantee the compliance with existing data protection laws (eSecurity 2010). Inconsistencies among legal framework within the Member States should be addressed by further harmonisation of legal measures. In relation to cooperative system the eSecurity WG recommended that following focus points (see section 2.3):

1. Ensure necessary standardisation and harmonisation of security solutions.
2. Validate security and privacy mechanisms for the first generation of cooperative systems in field operational trials.
3. Undertake research activities on security and privacy issues for the next generation of cooperative systems.

It is recommended to use the FOT phase to apply these guidelines and gain experience with the issues. The stakeholders that should ensure the application of these guidelines are privacy protection agencies and representative organisations e.g. ERTICO, FIA or EDPS.

3.2.10. Strategy 10: Stakeholder persuasion (business planning arena)

- 38) It is recommended to decide on building the organizational scheme of the service (system/application) in accordance with the SAFESPOT architecture (solved)
- 39) It is recommended to decide on licensing the operational and maintenance aspects to commercial organisations which will make it cheaper (to be done)
- 40) It is recommended to decide if a financial investment from public authorities is needed if commercial organisations are unable to reduce sensor costs or roadside unit cost (to be done)
- 41) It is recommended to decide on mapping the activities related to the system static data update (e.g. maps) onto the responsible entities. (to be done)
- 42) It is recommended to decide on which public entities propose the integration with the Safespot system based on the benefits identified for both parts (local authorities, drivers' associations, police, emergency services, etc.). It is necessary to formulate a proposal of collaboration. (to be done)

For recommendation number 38 and 41, building the organizational scheme and the mapping of activities, a first possible organisational architecture has been designed inside WP6.3. This mapping includes giving entities responsibilities for specific tasks. The other recommendations will come later in the process and therefore still need to be decided upon.

Furthermore in WP6.6 alternative government strategies have been identified this allows for the clarification of the different roles the public authorities could have, besides the already fixed roles specific for public authorities.

Stakeholders: All main stakeholder groups should be involved in the open platform alliance to maintain coherence. These are the car industry, electronic and telecom industry, service providers and public authorities. Besides this organisations that work in the value chain, also the standardisation organisations will be on the table. Exactly which stakeholders participate in the open platform alliance depends on deployment scenario. Car industry is in any case necessary. The rest of the stakeholders need to be filled in later.

3.2.11. Strategy 11: PR/Communication (business planning arena)

- 43) It is recommended to decide on actions to ensure proper and updated system usage (user manuals, communication dealer-purchaser, training, involvement of external entities such as car driver associations, helpdesk service, etc.). (to be done)
- 44) It is recommended to decide on the type and amount of compensation and the procedures to follow in case of an accident. Involvement of insurance companies within the SAFESPOT delivery chain is recommended. (to be done)
- 45) It is recommended to decide on an awareness campaign in order to provide the most possible detailed and transparent information. (to be done)

Recommendations within this strategy still need to be decided upon due to the fact that these recommendations only follow in a later stage of the deployment of SAFESPOT.

Stakeholders: The provider of the system is likely to be responsible for the public relations (PR) and communication in relation to a SAFESPOT system. It is not yet clear which stakeholder will do this. It depends on the deployment scenario.

3.2.12. Strategy 12: Business model (business planning arena)

- 46) It is recommended to decide on setting up periodical investigations among users to collect possible additional requirements and identify the entity in charge of such research. (to be done)
- 47) It is recommended to decide on planning periodical benchmarking in order to monitor the competitors' innovations. (work in progress)
- 48) It is recommended to decide on how to ensure Safespot applications can be deployed even with less than 100% equipped cars. (done)
- 49) It is recommended to decide on adopting a marketing strategy including (to be done):
 - a. raising awareness on the service limits when less than 100% vehicles are equipped
 - b. incentives such as tax reductions during the initial deployment phase.
- 50) It is recommended to decide at an early stage in the project on some determination of the initial cost, agreed and continuously monitored (market research). (work in progress)
- 51) It is recommended to decide on actions to push legislation or system providers to provide financial contribution (as a loss leader) and local authorities to provide monitoring/maintenance costs. (to be done)
- 52) It is recommended to decide on a strategy to enable manufacturers to reduce the purchase, installation and operating costs of the new infrastructures. (work in progress)

With respect to recommendation 48 a first step has been taken within D6.6.2, where competing systems from the US and Japan were studied. The results of this study however need to be updated after a period of five years to see the developments in the other areas and compare this to the existing situation in Europe. For the following recommendation (functionality with less than 100% equipped cars) has been decided and proven in SP4 and SP5 that only with a limited number of equipped cars the functionality of SAFESPOT (including the impacts) still can be reached. In D6.5.1 a market assessment is reported, based on user acceptance surveys and stakeholder surveys performed in SAFESPOT. Although this has been performed at a preliminary stage, it is recommended that a continuous monitoring will take place. The last recommendation has been addressed within work package 6.7. The other recommendations still stand as they are.

Stakeholders: Business and marketing specialists from industry and road authorities need to discuss and negotiate business cases. Partly, potential business cases can be defined and analysed based on the requests from the work programme of the 7th framework calls of the EC and the resulting projects.

3.2.13. Strategy 13: Deployment (deployment arena)

- 53) It is recommended to decide on who takes the role of service provider and content provider. (to be done)
- 54) It is recommended to decide on the requirements for a system functionality indicator. (done)
- 55) It is recommended to decide on the responsibilities for taking action within the emergency scenario. (to be done)
- 56) It is recommended to decide on the requirements for technical standards and legal standards. (to be done)
- 57) It is recommended to decide on the contribution of infrastructure operators with respect to the geographical roll-out. (to be done)

Recommendation 55 has been covered in the development of the ESPOSYTOR instrument developed as a horizontal activity within SAFESPOT (see e.g. D3.4.5) to be able to monitor the status of the SAFESPOT system. Identification of the responsible stakeholders who should take action during an emergency when the SAFESPOT-system is operational still needs to be decided upon. With respect to the recommendation 57 a first step has been taken (see amongst others section 2.8).

Stakeholders: Currently there is no consensus between European stakeholders on the deployment path for a SAFESPOT system. The European car industry and service industry need to continue this discussion. The anticipated FOTs in the 7th framework calls of the EC are a good platform to facilitate this discussion, since stakeholders are working together.

3.3. Conclusions on the decision making process

The strategies in section 3.2 were categorised in five decision making arenas:

1. the community of interest arena,
2. the technical arena,
3. the legal arena,
4. the business planning arena and
5. the deployment arena.

The sections below describe the match between the current situation and the decision making arenas as recommended in deliverable 6.4.5. The section below describes the stakeholders participating in each arena, and the main issues that are currently on the agendas.

For completeness sake the steering committee is introduced here as well, although no changes have taken place for the steering committee. The text is copied from D6.4.5 to show what was stated.

3.3.1. Steering Committee

The steering committee should consist of at least one representative per arena and led by one "champion". This previously called Mr. or Mrs. SAFESPOT should come from one of the defined arenas, a more appropriate naming at this point could be Mr. or Mrs. Cooperative Systems. Thus, the steering committee basically consists of the chairs of the different arenas. Specific persons can be added to this committee if their influence on the deployment of the SAFESPOT system (or cooperative systems in general) can be considered very positive. The Cooperative Systems champion is the chair of the steering committee.

The agenda of the steering committee consists of the decisions that will be made in the different arenas which influence the other arenas. These relations need to be monitored and if necessary adjusted by the steering committee in order to ensure that all communication is correct.

The steering committee also has a role in matters where two different arenas are deciding on the same issues. If this is the case, the steering committee will support the decision that seems the most relevant for the deployment of the SAFESPOT system.

In addition to ensuring that all communication between the arenas is correct, increasing awareness of the SAFESPOT system and its functionalities is also a task of the steering committee.

3.3.2. Community of interest arena

This community of interest guides and coordinates the realisation of cooperative systems. This means that high representatives of the main stakeholders should be represented here.

The most important agenda setting stakeholder in this arena is the EC, by means of the 7th framework calls for FOTs. Other relevant stakeholders are the proposal coordinators and the other organisations involved in the proposals.

The main recommendation for the decision making process in the community of interest arena is to facilitate the discussion about deployment as described in deliverable 6.7.1 *SAFESPOT Deployment programme* between the main stakeholders. The high level discussion should be fed with discussion on the level of conferences and e.g. the FOT-NET networking platform. Stakeholders that should be involved are e.g. the C2C consortium as representative of the automotive industry, Easyway as a representative of the road operators and road authorities and stakeholders from the ICT sector such as telecom providers and navigation providers.

3.3.3. Technical arena

In the technical arena in Europe, the engineers have been building a 'proof of concept' version of a cooperative platform with many different applications. The stakeholders involved in the technical arena are the engineers of organisations participating in the three cooperative IPs COOPERS, CVIS and SAFESPOT. These organisations are from the ICT service industry, the automotive industry, road operators and authorities and research organisations. The architecture is consolidated in standardisation working groups of ETSI, CEN and ISO.

As a follow-up, the 7th EC framework work programme anticipates FOTs to further develop the proof of concepts to system that are ready to market and to determine the effects of these systems. This will be organised as a group of national 'test sites' in amongst others Germany, France, Italy, The Netherlands, Norway, Sweden, and Denmark. These national test sites are suitable to facilitate engineers of different companies to continue.

3.3.4. Legal arena

The legal arena deals with changes in legal frameworks (e.g. creating legal obligations for stakeholders, allocating risks through statutory liability provisions) and legal relationships between stakeholders (e.g. standards, contracts).

Currently, by mandate of the EC, the standardisation bodies are formalising the standards for cooperative driving that have been developed in the 6th and 7th framework integrated projects. These standards should be applied and developed further in the FOT phase.

The successful deployment of SAFESPOT applications may also require (substantial) changes in existing legal frameworks involving governmental institutions such as the EU and national governments as primary responsible 'stakeholders'. The proposal for an ITS Directive currently under debate is an example of such a legislative intervention to support the deployment of SAFESPOT and other ITS systems.

3.3.5. Business planning arena

The business planning arena should develop business propositions for all stakeholders. All main stakeholder groups will be involved in the open platform alliance. These are the car industry, electronic and telecom industry, service providers and public authorities.

Exactly which organisations participate depends on deployment scenario. Car industry is in any case necessary. The rest of the stakeholders need to be invited to the arena when the business cases are identified.

The main recommendation is to ensure that the expected benefits are 'proven' by the FOTs. This provides the argumentation for business propositions.

3.3.6. Deployment arena

The deployment arena intends to speed up the realisation of a SAFESPOT system. Currently there is a discussion on the deployment of cooperative systems. To realise a single European platform for a SAFESPOT system (short range cooperative safety system), it is recommended to create a public debate among all involved stakeholders on the deployment of cooperative system. This debate will be guiding for the realisation of a SAFESPOT system, and therefore the stakeholders should be on the community of interest level.

4. Consolidation of content recommendations

This chapter focuses on the content recommendations, contrary to the process and decisions that need to be made the content recommendations focus on aspects that are still under investigation or for which answers are needed to facilitate the deployment process.

4.1.1. Strategy 1: Technical (Community of Interest)

- 1) It is recommended to define standards for V2V and V2I communication to enable European roll-out (work in progress)
- 2) It is recommended that the deployment plan focuses on the integration of the Safespot system and other systems. (work in progress)
- 3) It is recommended to determine the impact of safety critical and non-safety services on the required bandwidth and frequencies. (work in progress)
- 4) It is recommended to define certification procedures to enforce quality standards. (to be done)
- 5) It is recommended to define enabling administrative structures to ensure quality control procedures in order to minimize legal liability. (to be done)
- 6) It is recommended to define European standards for presentation of traffic information for cooperative systems. (to be done)

In this section the technical related recommendations are formulated which need to be solved by the community of interest, more specific technical recommendations can be found in the technical arena (section 4.1.5 & 4.1.6).

The first recommendation is on standards for V2V and V2I communication. These standards are being developed by several organisations. The organisations dealing with standardisation with relation to cooperative systems in Europe are ETSI, CEN and ISO. They cooperate and coordinate the standardisation issues. The preliminary work items are Classification and management of ITS applications in a global context, Co-operative system application messages, protocols and profiles, ITS application requirements for automatic selection of communication interfaces, Definition of LDM concept (Schade, feb 2010).

An important standard is CALM (Communications access for land mobiles). CALM is an initiative by the ISO TC 204/Working Group 16 to define a set of wireless communication protocols and air interfaces for a variety of communication scenarios spanning multiple modes of communications and multiple methods of transmissions in Intelligent Transportation System (ITS). The CALM standard is still work in progress. Therefore, large scale implementations of the standard do not yet exist. CVIS is a project funded by the EC in the sixth framework program (FP6). The aim of the project is to develop and implement a communication infrastructure based on the CALM architecture. CVIS will implement CALM M5, 2G/3G and IR as communication media. The implementation has been tested at several test locations across Europe with a wide range of ITS applications.

The second recommendation is on a deployment plan. The SAFESPOT deployment programme describes scenarios about both dedicated short range platform for safety applications, as well as scenarios about platforms with several communications channels that support a range of applications.

The third recommendation is on impact assessment. Impacts assessments are performed both in the SAFESPOT project, as well as in other projects and FOTs with cooperative systems that are currently being planned.

4.1.2. Strategy 2: Legal (Community of Interest)

- 7) It is recommended to verify legal implications of system architecture and design in parallel and in interaction with other sub-projects in BLADE. (work in progress)
- 8) It is recommended to define design and performance standards as well as test procedures to validate conformity with these standards (to be done)
- 9) It is recommended to develop institutional arrangements/legal framework that's supports an efficient/preferred organizational architecture (to be done)
- 10) It is recommended to determine whether a legal obligation (e.g. law) to store data in-car will contribute to a faster deployment (to be done)
- 11) It is recommended to define requirements for a modular technical architecture. (solved in SF)
- 12) It is recommended to define testing goals from a liability perspective. (to be done)
- 13) It is recommended to define requirements for auditable trail in the technical design. (to be done)

The recommendations, formulated for this strategy, are legal related and need to be solved with all stakeholders, more specific legal recommendations can be found in strategies 8 and 9.

Many of the legal recommendations still need to be done. The focus has been on the proof of concept from a technology point of view. Legal issues will be addressed when the technological proof of concept stage is finished. Legal issues have not been taken into account as a design parameter in this stage. It is still relevant to take legal issues into account in next and more final versions of the designs of cooperative systems.

4.1.3. Strategy 3: Deployment (Community of Interest)

- 14) It is recommended to define requirements for a modular technical design. (work in progress)
- 15) It is recommended to determine interoperability standards for the technical specifications. These standards can be based on scenarios. (work in progress)
- 16) It is recommended to define road types, user groups and phases that the deployment is likely to follow. Different scenarios need to be defined. (work in progress)
- 17) It is recommended to record in detail the benefits of the system, as demonstrated in the trials. (to be done)
- 18) It is recommended to appoint a 'Mr. Cooperative systems', or a high level Supervisory Board to create awareness among professional stakeholders. (to be done)

This strategy discusses deployment issues and the organisation of an interest group for cooperative systems, more specific deployment orientated recommendations can be found in strategy 10. An extensive deployment programme containing deployment scenarios, challenges and recommendations for the main stakeholders can be found in SAFESPOT deliverable 6.7.1 *SAFESPOT Deployment Programme*.

The first steps towards deployment are in progress (see the first three recommendations). The following steps (recommendation on FOTs/trials and on a 'Mr SAFESPOT') are planned. For the EC seventh framework calls, cooperative FOT projects are being planned. Also, in the context of the DRIVE proposal, part of these plans is to form an Open Platform Alliance (OPA) (See section 2.6). This is an alliance of the main stakeholders with the goal to develop a platform for cooperative systems.

4.1.4. Strategy 4: Business planning (Community of Interest)

- 19) It is recommended to determine cost-effectiveness to ground government investments (work in progress)
- 20) It is recommended to analyse users' willingness to pay. (work in progress)
- 21) It is recommended to analyse the willingness of end users to be monitored by the system. (to be done)
- 22) It is recommended to develop an incident management plan. (to be done)
- 23) It is recommended to show safety effects or statistics on in-car display, on-trip of post-trip. (to be done)
- 24) It is recommended to emphasise the effects of safety systems in a marketing plan. (to be done)
- 25) It is recommended to provide the opportunity for service providers to create a competitive advantage. (to be done)
- 26) It is recommended to include other stakeholders in the business case (insurers, lease companies, telecom operators) and determine their conditions for participation. (to be done)

This strategy discusses recommendations related to business planning that need all stakeholders. More specific business planning recommendations can be found in strategy 12 in the Business planning arena.

Much of the business planning has yet to be done. Before it can be done, many of the current uncertainties, e.g. on the exact configuration of the system and the performance, still need to be solved. A start has been made in the SAFESPOT and other projects to determine the cost effectiveness and the user perception and willingness to pay, but further steps are required. FOT's might be a huge step in reducing the uncertainties and enable more solid business planning.

4.1.5. Strategy 5: Standardisation (technical arena)

- 27) It is recommended to develop a common standard for recognizing the accident scenarios and/or the warning message generation to avoid brand specific solutions. (work in progress)
- 28) It is recommended that an evaluation be made as to whether the SAFESPOT system complies with health standards concerning radiation. (solved)
- 29) It is recommended that task groups are set up to develop standards on a functional level. (work in progress)
- 30) It is recommended that research activities should focus on interoperability issues involving road operators from different countries. (work in progress)

This strategy presents recommendations to ensure a standardised implementation of a cooperative system that is compatible with systems from other manufacturers and other countries.

Standardisation is recognised as a crucial issue in cooperative systems, and the recommended actions are taken seriously and are in progress. Working groups of the major relevant standardisation bodies CEN, ETSI and ISO are cooperatively addressing the different aspects of cooperative driving (Schade, 2010).

4.1.6. Strategy 6: Performance / quality (technical arena)

- 31) It is recommended to allow on-line system updates in the design of the system. (to be done)
- 32) It is recommended to allow hardware updates in the design of the system. (to be done)
- 33) It is recommended to investigate whether and how the different system implementations can be diagnosed. (to be done)
- 34) It is recommended that the system shall be able to implement both an adaptive and adaptable interface for the near future (to be done)
- 35) It is recommended to test the developed interface with road users from different regions. (to be done)
- 36) It is recommended to determine, on the base of a quality standard, at which quality level different services operate in different circumstances and to inform the driver promptly in case the SF system operates outside the specified quality/performance limits. (to be done)
- 37) It is recommended to determine the minimal system functionality needed for 'daily use' of the system. (to be done)

This strategy provides recommendations to ensure a good system performance and a minimum quality level. The status of the recommendations in this strategy (all still need to be done) indicates that the first technical proof of concept was realised on a dozen of vehicles. In the next step when more vehicles will be equipped in FOTs, the following recommendations are very relevant to make these FOTs successful.

4.1.7. Strategy 7: User/HMI (technical arena)

- 38) It is recommended to assess the SAFESPOT Human Machine Interaction (HMI) design against HMI design principles. (to be done)
- 39) It is recommended to develop a test plan for the Safespot system concept using real end-users on a large scale for a long term period (FOT) and in different regions. (to be done)
- 40) It is recommended to include a "switch-off functionality" for the user and consider incentives for switching back on (consider user acceptance and legal reasons). (to be done)
- 41) It is recommended to test the developed interface with road users from different regions. (to be done)

Recommendation 38 is tested in the validation phase of the SAFESPOT concept (see SP4 and SP5, WP5). Recommendation 39 and 41 are covered in the working programme of the EC in the 7th framework which consists of the establishment of a FOT in various regions and with real end-users. Recommendation 40 still needs to be taken into account (including research on the necessity of such a switch).

4.1.8. Strategy 8: Legislation (legal arena)

- 42) It is recommended to create a Code of Practice for co-operative systems to include their minimal functional requirement and to set standards of quality and service. (to be done)
- 43) It is recommended to extend the Code of Practice for the organization aspects in the operational phase (to be done)
- 44) It is recommended current regulation and laws in the member states be harmonised. (to be done)
- 45) It is recommended to identify insurers/reinsurers who would be interested in providing insurance to actors and for the system itself. (to be done)
- 46) It is recommended to record in detail the benefits of the system, as demonstrated in the trials for the purposes of insurers. (to be done)
- 47) It is recommended to define the key drivers for road operators to agree to install the SAFESPOT system onto their infrastructure. (to be done)

Only recommendations 45 and 46 have progressed a bit further during the course of the SAFESPOT project. In WP6.5 the benefits of the system have been calculated and divided over the various stakeholders. The next step, which is the actual recommendation, is to see how insurers will fit in this picture. The key drivers for road operators are being discussed in D6.6.2.

4.1.9. Strategy 9: Privacy/ data storage (legal arena)

- 48) It is recommended to develop Safespot systems to conform to European data privacy regulation. (to be done)
- 49) It is recommended to collaborate closely as between the legal team and the technical team to ensure that the Safespot development conforms to data privacy legislation. (to be done)
- 50) It is recommended to determine whether a legal obligation to use an electronic data recorder (EDR) will contribute to the deployment of cooperative safety systems. (to be done)

With respect to recommendation 48, this needs to be covered in the design of the system during the next stage of FOT's. For the other two recommendations this still needs to be decided upon in a later stage of the deployment of SAFESPOT.

4.1.10. Strategy 10: Stakeholder persuasion (business planning arena)

- 51) It is recommended to incorporate the benefits of public bodies into the business case of OEMs. (done)
- 52) It is recommended to continuously monitor operational and maintenance costs. (to be done)
- 53) It is recommended to list possible "breakdown scenarios" and identify actions for every single possible breakdown in order to bring the system to a safe state. (to be done)
- 54) It is recommended to identify the role in the business model of other stakeholders who might benefit from SAFESPOT systems. (to be done)
- 55) It is recommended to develop a business model for the extension of the SAFESPOT system service into the new covered areas. (to be done)

Recommendation 51 has been dealt with in WP6.6 (see D6.6.2), the other aspects still need to be covered and will follow later in the process of deployment.

4.1.11. Strategy 11: PR/Communication (business planning arena)

- 56) It is recommended to develop a communication and promotion plan for communication towards the end-user. (to be done)
- 57) It is recommended to evaluate a system usage training module within the business case for the most critical applications (to be done)
- 58) It is recommended to develop a communication strategy for the positioning of the SF system in the market (to be done)
- 59) It is recommended to focus on the effects of the Safespot system to create the required political commitment. (done)
- 60) It is recommended to acquire information on the levels of exposure to radiation. (to be done)
- 61) It is recommended to evaluate costs of a helpdesk service. (to be done)

The 59th recommendation has been covered in D6.5.1 where the effects and impacts of SAFESPOT have been translated into monetary terms. This can, combined with the role of public authorities as discussed in D6.6.2 covers this recommendation. The other recommendations still need to be covered.

4.1.12. Strategy 12: Business model (business planning arena)

- 62) It is recommended to determine the willingness to pay of potential customers such as end-user, lease companies, insurers. (work in progress)
- 63) It is recommended to determine the willingness to pay considering the deployment goal and path of the end-users, lease companies, insurance companies. (work in progress)
- 64) It is recommended to determine under which conditions/in which business model the local road operators are willing to participate. (to be done)
- 65) It is recommended to standardize on a functional level and to leave room for service providers to differentiate from competitors. (to be done)
- 66) It is recommended to decide on roles and responsibilities of actors in case of a major failure. (to be done)
- 67) It is recommended to design the system in such a way that is can be tailored to target groups. (to be done)
- 68) It is recommended to determine if packaging of safety services increases the commercial viability of these safety services. (to be done)
- 69) It is recommended to investigate how service providers get paid for vehicles from a different geographical area, using their service. (to be done)
- 70) It is recommended to identify "key components" in relation to their vital importance for the system operation and their availability on the market. (to be done)
- 71) It is recommended to define a procedure for system updates in operational phase, and assess possible financial consequences for the Business case. (to be done)

Within WP6.5 a market assessment including an end-user analysis has been done. However, the willingness-to-pay from other stakeholders still needs to be investigated. Better results from user surveys are expected in case users have a better awareness of Cooperative Systems. Because of the current status of development of the systems user surveys need to be regularly repeated.

4.1.13. Strategy 13: Deployment (deployment arena)

- 72) It is recommended to determine the phases in range of available services to create a proper geographical coverage of the SAFESPOT services. (to be done)
- 73) It is recommended to determine the phases in geographical roll-out. (to be done)
- 74) It is recommended to initially deploy the SAFESPOT system in urban areas. (to be done)
- 75) It is recommended to create advantages for early adopters to stimulate rapid deployment. (to be done)
- 76) It is recommended to start implementing the SAFESPOT system within professional fleets from e.g. lease companies. (to be done)
- 77) It is recommended to define the degrees of system failure and develop an emergency scenario. (to be done)

All recommendations still need to be covered, logically due to the fact that the actual deployment of the system still needs to start.

4.2. Concluding remarks

Looking at the progress made the content recommendations are put in perspective here, focusing on the important aspects for the deployment of SAFESPOT.

4.2.1. Community of interest

The most important recommendation in this retrospect focuses on the V2V and V2I communications standardisation. This has been taken up by ISO and ETSI. This is work in progress and SAFESPOT is closely connected to these developments.

Another important recommendation focuses on the legal aspect of cooperative systems where legal should be seen as a design parameter. This is further explained in section 5.3.

Furthermore the validation of costs with respect to the business planning validation from costs and benefits is an important aspect, discussed in section 5.2.

4.2.2. Technical arena

Although a SAFESPOT monitoring system has been developed (ESPOSYTOR) the measuring of performance and definition of quality indicators for such systems still needs to be done, this is work which can be covered within FOT's.

An important aspect of this arena is the design of the HMI. For further information on the HMI see section 3.2 in the next chapter.

4.2.3. Legal arena

The main focus here is how privacy can be incorporated within the development and design of such a system. As stated in section 2.4 the European privacy watch-dog organisation is keeping an eye on the actual design and progress.

4.2.4. Business planning arena

Validation of costs and benefits and the number of stakeholders that can or should be involved are the two most important aspects within this arena.

4.2.5. Deployment arena

The deployment recommendations are all still to be done.

5. Recommendations for FOT's

Coming from the external influences and with the final recommendations on how to deal with risks and legal aspects the next step in the deployment process, FOT's is scrutinized here to provide further indications for research and research questions.

Four phases in the deployment process are identified (see Figure 5.1: Deployment phases). We are now at the end of the proof of concept phase, so the next phase is the FOT phase. Different issues are relevant in different phases. Therefore also different recommendations are relevant in different phases. For the FOT phase the relevant issues are issues that need to be solved to enable the take off. The issues are:

- Privacy and security
- Validation of costs and benefits
- Legal framework

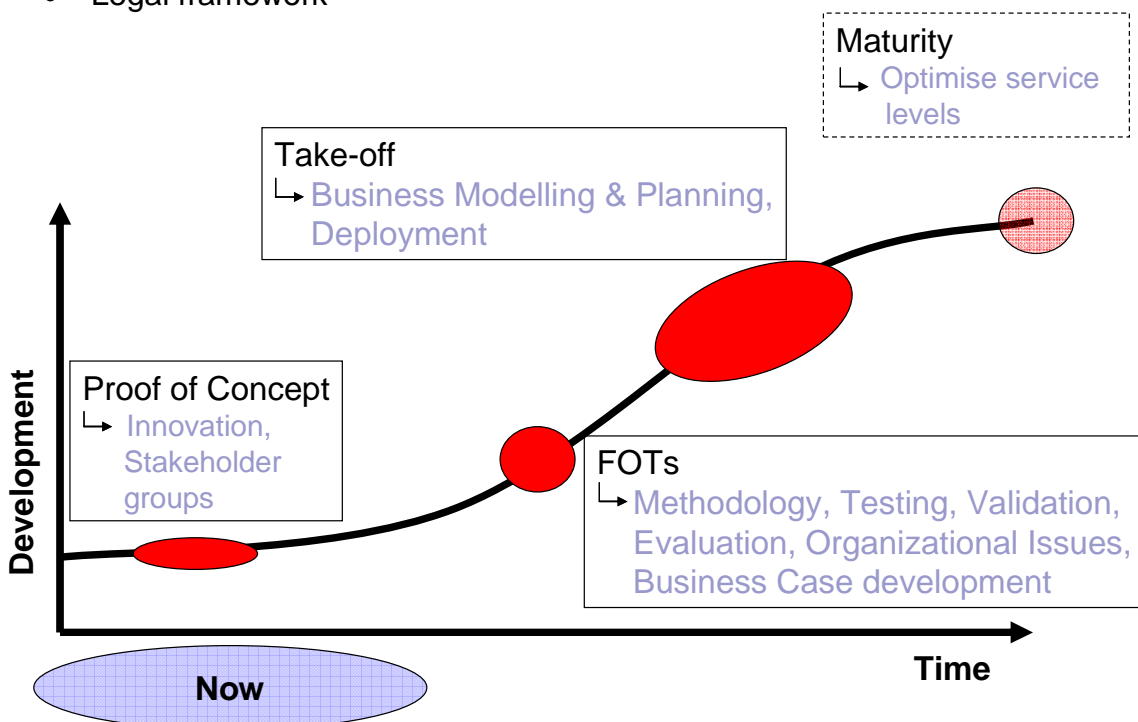


Figure 5.1: Deployment phases

5.1. Field operational tests

Field operational tests (FOTs) are widely seen as the next step in the deployment of cooperative systems. Cooperative FOTs are being planned on several national and regional European test sites and combined for 7th framework calls of the Directorate General Information Society and Media of the European Commission. The strong recommendation to reduce the current uncertainty about the impacts of cooperative systems is being taken on. Currently and number of European FOTs on standalone intelligent transport systems are in progress. These projects are EuroFOT and TeleFOT. The lessons learned in these FOTs are consolidated into the FESTA methodology in the FOT-NET networking platform. FOTs with cooperative systems face additional challenges to FOTs with standalone systems. FOT-NET dedicated a workshop to these cooperative FOTs during the Cooperative Mobility Showcase in Amsterdam (FOT-NET 2010). Since FOTs are the next step in the deployment of

cooperative systems, the next chapters provides recommendations for cooperative FOTs.

5.2. Road pricing and tolling

In deployment the synergies between various platforms and typologies of systems (comfort, safety and services) has been part of the discussion. Interestingly the discussion of road pricing and technologies needed for that has (until recently) be kept aside of current developments with respect to cooperative systems. This observation is mentioned here to create the awareness amongst developers and interested service providers to try and find synergies between the various typologies of systems.

Especially since, in various countries road pricing has been discussed on a theoretical level and a first set of examples for implementation are being set in Norway and the UK. In the Netherlands the discussion about road pricing is focussing on implementation of a road pricing system for the complete Dutch road network. This gives the opportunity to create interalliance between various platforms and creates further synergies with respect to potential service providers willing to provide the 'SAFESPOT'-box.

5.3. Privacy and security

Strategy.2: Legal (community of interest) and Strategy 9: Privacy/ data storage (legal arena), provide recommendations on privacy and security. These recommendations were not yet taken up in the SAFESPOT project. Privacy and security did not have priority in the proof of concept phase of the last few years. In the FOT phase however, the recommendations become urgent. Before the take off phase start and cooperative systems come on the market, privacy and security needs to be addressed.

Currently privacy and security issues are being addressed in a number of EU projects and organisations, being SEVECOM, GST, EVITA, OVERSEE, PRECIOSA, CVIS, eSafety Forum, Car2Car and the standardisation bodies.

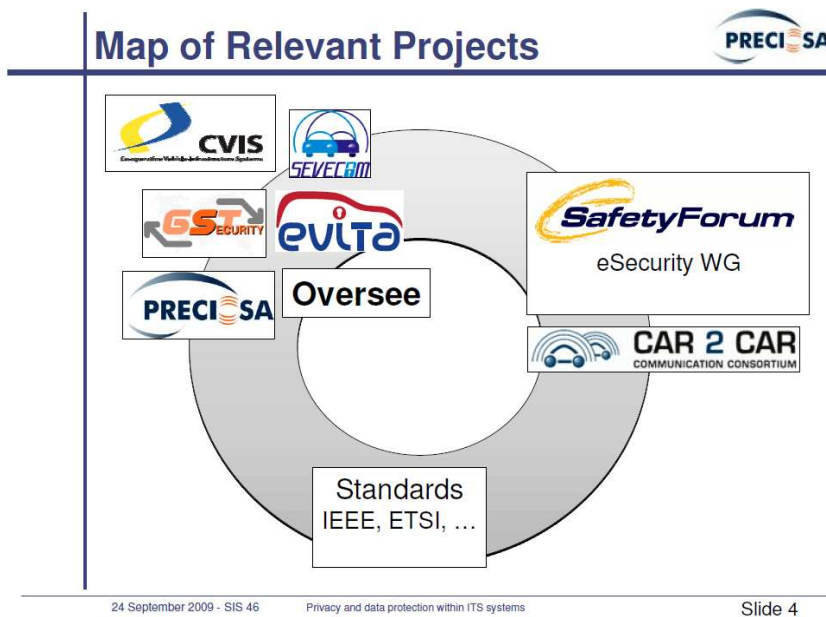


Figure 5.2: Relevant organisations for privacy and security (Preciosa, 2009)

For privacy and data protection, overall guidelines come from the Organization for Economic Cooperation and Development (OECD) and enshrined in EU. Relevant EC directives are on privacy (2002/58/EC) and on data protection (EU Directive 95/46/EC) (ETSI WG 5, 2010). This is especially relevant in the cooperative FOTs that are anticipated in the 7th framework calls from the DG Information Society & Media from the EC. The cooperative systems assessed in these FOTs should be designed and tested on meeting the privacy and data protection requirements resulting from these guidelines.

For security, an inventory should be made of the results from the projects mentioned above, e.g. the SEVECOM Baseline security specification (SEVECOM, 2009), which results in commonly agreed security standard for cooperative systems. The cooperative systems that are being assessed in the upcoming cooperative FOTs should be designed and tested to meet these security standards.

5.4. Validation of costs and benefits

The costs and benefits of a system like SAFESPOT are difficult to estimate since the projects focus was on delivering a proof of concept and not so much a valid business case. Within BLADE however a real attempt was made to create such a valid business case, which proved quite harsh based on the available information both on costs and benefits.

The availability of the information asked for a number of assumptions in the last phase of the project for the work packages involved with costs and benefits (knowingly WP6.5 & WP6.6). The assumptions made in these work packages are all based on expert opinions and convey the state of the art knowledge at that point of the project. Nevertheless these assumptions need to be validated in a

comprehensive way in order to be able to create more solid ground for costs and benefits of cooperative systems (and results coming from the analysis performed).

The next phase (FOT's and take-off) the costs and benefits will get a more solid ground based on the technological developments and choices for the system. The assumptions made within SAFESPOT can be validated within the FOT's and the business case can be further detailed.

Another aspect, especially valid for the developments of the costs, is the economies of scale aspect. This is an interesting aspect since items tend to get cheaper if they are produced in larger quantities. The main question is how this would influence the costs at the take-off and how quickly the costs of the system will be reduced.

5.5. Legal framework

The main conclusion from T6.4.2 has been that legal issues to an important such as liability and privacy should be taken into account and approached as a design parameter if a cooperative system is being developed (meaning that legal implications of system design and architecture should be considered early in, and throughout the development process). However, there remains the need to assess the legal implications when the technical and organisational details of a field test can be foreseen. Furthermore, the implications may differ between jurisdictions. It is therefore vital to involve legal expertise from the country in question when planning a Field Operational Test (See FESTA D. 6.3, 2008).

Currently when taking into account cooperative systems which immediately implies the cooperation between stakeholders legal is placed into a new perspective. Within this framework of cooperative systems the liability for such a system strongly depends on the roles, tasks and responsibilities which are discussed in the organisational architecture. The main recommendation is that in the ideal situation during an FOT the deployment should be presented as close to real-time as possible. This would allow for testing as well as discussing (if necessary) the legal aspects if such an interesting situation occurs.

6. Conclusions

In general the decision making process that was proposed in the preliminary recommendations report is still relevant. The arenas still cover the process and content recommendations and most recommendations are still valid to be taken into account in the next steps of deployment.

6.1. Decision making process

To realise a SAFESPOT system, a process is ongoing in which many decisions are being made. These decisions and their order were described in SAFESPOT deliverable 6.4.5 *Preliminary recommendations based on risk and legal analysis*. Five decision making arenas have been identified, and in conclusion five crucial decisions are identified. This section will reflect on these crucial decisions.

In this document the current decision making process has been mapped on the decision making arenas. The mapping shows which parts of the decision making process have started and which are staid behind.

6.1.1. Consolidated process recommendations

Five crucial decisions that have been identified in SAFESPOT deliverable 6.4.5 are discussed. These decisions are important because they have a major impact on the decision making process in several arenas. This section will indicate the status on these crucial decisions.

1) Related to data storage and access to the data, the most important decision in relation to data storage is the application of an in-car data recorder or Electronic Data Recorder (EDR).

Although this has major consequences for the liability of the driver and the system providers, this decision is to be made in a later phase. We have now finished the proof of concept phase, which deals with technological feasibility of the SAFESPOT concept. Decisions on the legal aspects depend on the specific system configuration, which is not yet known. This recommendation becomes more relevant in the next phase, in which FOTs will be performed. However, the decision can only be made final at the end of the FOT phase, for the actual market introduction.

2) A deployment plan for SAFESPOT using scenarios needs to be thought through and decided

Deployment has become a relevant issue in the last year of the proof of concept phase. A SAFESPOT deployment programme has been made in which deployment scenarios are created, deployment challenges are identified and recommendations are made to the main stakeholders. There is a clear common view on the necessity of FOTs as a next step. The discussion on which deployment path is more feasible and desirable is still ongoing. One option is to follow a classical product development approach resulting in a factory fit system. Another option is to extend on the current nomadic platform. To realise one European platform it is recommended to continue this discussion and determine the performance and limitations of different system configurations in the FOT phase.

3) Stakeholders in the business model need to be examined

The decision about which stakeholders play which role in the value web is still an open question. Different business models have been assessed in SAFESPOT work package 6.3 *Business modelling*. The next step for the stakeholders is to calculate the business cases. This step requires the results of the FOTs in terms of benefits of the different systems.

4) Standardisation needs to be arranged

Currently standardisation institutes ETSI and CEN have divided the work and, by mandate of the EC, are consolidating the results on the proof of concept phase, e.g. the CALM architecture, into standards for the different aspects of cooperative systems.

5) Human machine interaction (HMI)

Two decisions on the HMI were recommended. The first decision is whether to indicate the performance level of the system. Especially when the system performs below a minimal quality level, the user should be warned. A second decision is whether the user should be able to switch off the system.

The HMI was developed for the proof of concept system that has currently been developed. These recommendations were not yet an issue. HMI will be more relevant in the next phase, especially when several applications will be used on one platform.

6.1.2. Arenas

Based on the extent to which recommendations are being addressed, the conclusion can be stated that some arenas are more relevant at this deployment stage, compared to others.

The arenas that appear to be relevant now (during the proof of concept phase) are the technical arena. Issues in the technical arena that have been picked up are standardisation and performance of different system configurations. Since the main issues have been picked up at this stage, monitoring of these activities is of the utmost importance to be able to continue the work as soon as decisions have been made on relevant issues.

In the next phase the issues in the deployment arena become more relevant. Especially the challenge of how to overcome the minimum penetration level becomes relevant, also for the cooperative FOTs. In the FOT-phase also the legal arena will be a centre of activity. The FOTs will be a test case in this arena as well. Both liabilities and privacy issues should be dealt with for the road user participating in the FOTs.

The recommendations for business modelling will come after the FOT phase, although the timing depends on the deployment path.

6.2. Next steps

The phase following the proof of concept phase from SAFESPOT is the FOT phase, as discussed in chapter 5 the relevant issues are issues that need to be solved to enable the deployment of SAFESPOT. The issues currently identified are:

- Privacy and security
- Validation of costs and benefits
- Legal framework

In the upcoming work within the 7th framework these issues need to be covered in order to be able to get to the actual deployment of the SAFESPOT system.

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