FESTA. D6.3. FOT requirements, legal aspects planning and development

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D6.3: FOT requirements, legal aspects, planning and development

16th May 2008
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and:
T6.2: FOTs legal, ethical aspects, analysis of different national laws and regulations

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### List of abbreviations

<table>
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<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>Art.</td>
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<tr>
<td>BDSG</td>
<td>“Bundesdatenschutzgesetz” = Federal law on data privacy</td>
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<td>cp.</td>
<td>compare</td>
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<td>FOT</td>
<td>Field Operational Test</td>
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<td>OEM</td>
<td>Original Equipment Manufacturer</td>
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<td>and the following</td>
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<td>StPO</td>
<td>“Strafprozessordnung” = German code of criminal procedure</td>
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<tr>
<td>StVZO</td>
<td>“Straßenverkehrsverkehrsordnung” = German Road Traffic Licensing Regulations</td>
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Executive Summary

Chapter 1: Stakeholders requirements collected via on line questionnaire

In this document the results of the stakeholder questionnaire are analysed and discussed. The FESTA questionnaire to collect stakeholders requirements was answered by 86 respondents, coming from four stakeholder groups: industry, service providers, public authorities, and research institutes.

General conclusions to be drawn from the answers are that the stakeholders have an interest in Field Operational Tests for reasons of business, research & policies. Field Operational Tests may provide a better understanding of driving behaviour and system use, and information to be used for improving products. Stakeholders have high expectations and expect convincing results.

Good planning of Field Operational Tests is important but complex. Issues of privacy, liability and user acceptance have to be taken into account. The collection and handling of a very large set of behavioural data requires careful consideration. To ensure participants’ safety and reliable results, the systems to be studied should work correctly.

Automatic data collection is seen as the most efficient method, but also questionnaires and driver observations are also useful data collection methods. Field Operational tests are best performed on real roads with ordinary drivers. The respondents are optimistic about drivers' willingness to participate and install systems in their cars.

The European Commission should fund 50% of Field Operational Tests, and 100% of the material costs. The results should be published broadly, both to stakeholders and to the general public.

Chapter 2: Legal and ethical aspects

The legal issues related to Field Operational Tests (FOTs) must be taken seriously and considered at an early stage within the planning of such testing. Of great importance is the information on the functioning of systems to be evaluated. This must be provided to test participants as must information on data that is to be collected. Many of these aspects will also have a strong impact on contractual agreements between the organiser and test participants. Issues of general importance are highlighted in this report.

As far as the functioning of systems is concerned, it is of great importance to give the test participant advice upon the legal relevance of information provided by vehicle applications. Furthermore, the test participant must be diligently instructed on the use of uncommon systems integrated for the purpose of evaluation. This should include pointing out aspects such as full responsibility for the obeyance of traffic rules, system limitations and actions to be taken in case of defects.

As far as test participants are concerned, data privacy regulations are of great importance for FOTs as well: The amount of personal data collected within a FOT is tremendous (and would not be available under normal driving conditions). This personal data must be handled with care and the collection must keep in line with legal provisions. The advice provided within this report reveals which aspects might be critical and suggests how these aspects should be dealt with. Most important as far as data privacy is concerned, is to obtain the test participant’s consent to data collection (which is a strictly voluntary act and comprises an ethical component). The precautions to be taken within data processing to ensure privacy are of great importance too.
Insurance issues will also be of major interest within FOTs. Basic advice is provided to cater for the needs of special insurance coverage for the benefit of the test participant as well as the vehicle and integrated systems including data logging equipment.

Special licence issues for vehicles as well as test drivers are highlighted. In general, however, these issues should easily be overcome, either because of special provisions already in existence within national road traffic licensing regulations (e.g. privileges for automobile manufacturers) or because systems to be evaluated are mature (e.g. already on the market and approved of). Special licences for test drivers will – generally speaking – not prove necessary, as long as full drivers’ control is maintained.

Finally, as far as ethical issues are concerned, the key aspects for FOTs are pointed out and substantial information is provided on how to attain information valid for the concrete FOT.
1 Introduction

The FESTA Support Action Questionnaire to collect stakeholders' needs and indications on Field Operational Tests was a part of FESTA Task T6.1 – Analysis of the different stakeholders and their needs, relevant aspects and requirements on different level of FOT deployment.

The questionnaire question sets were designed in cooperation between VTT and CRF during November-December 2007. The survey was performed by VTT through a web survey tool “SurveyMonkey”, which serves several purposes: e.g. designing surveys, collecting responses, sending invitations and reminders and downloading or analysing the results.

The web survey was opened on 13th December 2007, right after the FESTA Stakeholder Workshop in Brussels. The opening of the survey was announced to the target group members by an email invitation which included an individual hyperlink to the survey. The recipient list for the invitation was mostly based on the Stakeholder Workshop attendance list that was supplemented by CRF and VTT with the other known FOT stakeholders. Two reminder email rounds were sent out to those who had received an invitation to the survey but had not responded – the first one on 21st December 2007 and the final one on 10th January 2008. The survey was closed on 24th January 2008.

The results reported are synthesised from the answers given by the respondents on the questions, which are given in Appendix 1. Next to the presentation of the results, some conclusions are drawn.

1.1 Stakeholder group

Section 1 & 11 of the questionnaire.

The FESTA questionnaire was answered by 86 respondents, coming from four stakeholder groups:

- Industry 26 (15 Original Equipment Manufacturers)
- Service providers 9
- Public authorities 8
- Researcher institutes and users 37 (only 3 from user groups)

So for the questions answered by all respondents, the results are based mostly on the answers from the industry people and researchers.

The questionnaire was anonymous, but 34 respondents provided their name and company.
1.2 Major foci of interest regarding FOTs

*Section 3 of the questionnaire.*

Respondents had different focuses of interest. Specifically, the item “market analysis and acceptance of new systems” had the highest score (49% of the respondents). Scores around 37-40% were gained by “Technology development” and “Boosting ITS uptake” and “Supporting European policies on Transport and Information Communication Technologies”. Other items scored between 10-33%. People who filled in other interests (17) mentioned mostly foci on research questions and on safety and other impact analysis.

In conclusion, interests of the respondents seem to vary widely, and are spread out rather evenly over foci related to commercial, technical, policy and research interests. This suggests that the group of respondents are of the opinion that FOTs can be used to answer a wide range of questions. This conclusion is supported by the answers on question 50, about the crucial questions to be answered by FOT, where we find an even wider range.

![Figure 1: main focus of interest](image)

1.2.1 Evaluation of the focus of interest, by respondents from industry

*Section 4 of the questionnaire.*

The questions in this part were answered by 21-27 respondents, coming from the industry stakeholder group.

The specific benefits of FOTs for different kinds of manufacturers and suppliers are both improving customers’ acceptance and improving system performance. Increasing customers’ willingness to pay is seen as somewhat less important, but is maybe also seen as part of the user acceptance. Other benefits mentioned by some respondents are related to safety, such as safe installation of systems. The scores differ somewhat on the benefits for different types of technology suppliers (OEMs, automotive, and nomadic device suppliers), but in general they are high, between 65-89% for user acceptance and 65-69% for improving system performance. The answer “no specific benefits” was not given. The benefits for basic technology suppliers are a bit different, where improving system performance is judged more important and some do not see any benefits at all (13%).

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The overall conclusion for the industry group is that FOTs can be used to improve the quality and performance of products, 92% agreeing with this statement. The motivation of the respondents for this very positive conclusion is that FOTs provide data from real-life and large-scale studies, allowing a deep understanding of the use of products and driver behaviour. This can then be used to improve system design.

![Figure 2: benefits of FOTs for industry stakeholders](chart)

1.2.2 Evaluation of the focus of interest, by respondents from service providers

Section 5 of the questionnaire.

The questions in this part were answered by 3-6 respondents, coming from the service provider stakeholder group. The small number makes it hard to draw firm conclusions.

The respondents were asked about the benefits for road operators, fleet operators, service providers, data providers and telecommunication operators, and insurance companies. In general high scores were given to improving services, mostly over 67%. An exception is the category of telecommunication operators, where willingness to pay has a high score (60%). Improving customers’ satisfaction is seen as less important (0-50%).

Like the industry respondents, service providers think that the FOTs can be used to improve quality and performance of the products (100%). They support this conclusion by stating that realistic and large-scale tests will eliminate the difference between service theories and practice and lead to improved quality and performance.

1.2.3 Evaluation of the focus of interest, by respondents from public authorities

Section 6 of the questionnaire.

The questions in this part were answered by 5-9 respondents, coming from the public authorities stakeholder group. The small number makes it hard to draw firm conclusions.

The respondents have a nearly equal preference for in-vehicle data acquisition (63%), on road data acquisition (50%) and tests with users on prototypes or equipped vehicles on public road (50%). There is not much interest in questionnaires to buyers of equipped vehicles (13%).
The 9 respondents are especially interested in the impact assessment of safety and mobility (88-75%), followed by environment, CO₂ reduction (63%). Driving comfort, competitiveness and economy are less interesting issues for them (0-13%). When asked to estimate the level of importance of the impacts, the same picture emerges. Safety and mobility score the highest (rating 4.5 on a five point scale), followed by environment (rating 3.6) and comfort, competitiveness and economic aspects (rating 2.3-3). These priorities show that public authorities are more concerned with social impacts than with comfort or economic aspects. Two thirds, however, think that FOTs should consider all of the possible impacts.

Their expectations of the outcome of a FOT impact assessment in order to use it as a decision making tool are diverse, but in general they expect clear empirical results, from which impacts on traffic can be determined.

1.2.4 Evaluation of the focus of interest, by respondents from research institutes and users

Section 7 of the questionnaire.

The questions in this part were answered by 25-33 respondents, coming from the research institute and user stakeholder group. Note that there are only 3 respondents who identified themselves as representatives of user groups.

The research group is of the opinion that all types of user involvement could be possible in FOTs: questionnaires to buyers of equipped vehicles, in-vehicle and on road data acquisition and tests with users on prototypes or equipped vehicles on road (73-84%), in-vehicle data acquisition being the most popular. Only involvement in the form of focus groups gets a lower score 50%. The value of questionnaires is judged much higher than in the opinion of the public authorities. It may be the case that the researchers have more experience with questionnaires, as this is a frequently used method, or that they see it as a good way to capture the subjective opinion of users, in addition to other, objective, methods.

![Figure 3: types of user involvement, possible in FOTs, by research institutes stakeholders](image)

Researchers are very optimistic that users would be prepared to install data acquisition systems in their cars to perform a FOT(88%). 44% of them indicate that even if the equipment is not type-approved users could accept the responsibility of the use of data acquisition systems.
The great majority of the respondents think that users involved in FOTs should be compensated (91%). The compensation should be monetary (79%), although gifts may also be considered (49%). 12 respondents thought also about other compensations. Half of these alternatives are material (such as insurance discounts or free installation of safety systems), the other half being immaterial or altruistic (such as getting knowledge of the results, contributing to the common welfare). One person warned against relations between the gift and the selection of user samples, for example giving invitations at motorsport events may attract sensation seekers. When the respondents had to choose one form of compensation, for example for a user involved in a one-year FOT who has to answer four questionnaires and install (and uninstall) a data acquisition device in his/her new car, again the majority would give monetary compensation (66%). The other respondents would give a gift or some other material compensation. Only one respondent would give nothing and another respondent an immaterial one. It can be concluded that some form of material compensation is deemed as indispensable for users involved in a FOT, especially if effort is required from the user. So the next question is what should be the value of the compensation. The majority think about an amount of 200 or 100 Euro (43-27%), the others about 500 Euro or 50 Euros (both 10%).

To understand the impact on driver behaviour the FOT should have a duration which can be measured in kilometres or hours. The majority prefer the first option (70%). However, there is not at all consensus about the quantity. For the kilometres the variation is between 2.000 and 400.000, with most of the answers between 5.000 and 15.000. A reason for this result is that respondents had a different interpretation of the question. Some respondents thought that the question asked about kilometres per driver and others thought that it was about the total amount of kilometres in the FOT. For the hours it varies between 50 hours and 12 months. Several respondents noted that it of course depends very much on the system and the research question.

There is a large consensus on the importance of considering user acceptability in the planning of a FOT (82%). Most respondents emphasise this statement by saying that it is needed to be able to understand effects and impacts, and to understand user behaviour. Willingness to pay is also an issue to be considered, but less than user acceptability (64%). The motivation is either related to better understanding of the value of systems and developing business cases or willingness to pay is seen as closely related to user acceptance.
1.3 Constraints and funding

Section 8 of the questionnaire.

The questions in this part were answered by 50-62 respondents from all stakeholder groups.

1.3.1 Constraints

The respondents identified two main ethical constraints to be considered when planning FOTs. The first is in the area of privacy, including data protection, confidentiality and legal issues (21 respondents). The other is in the area of safety (18 respondents). Some respondents wrote that FOTs should only make use of (relatively) technically mature systems in order not to endanger participants (6). Privacy and safety does not only concern the drivers, but also other people, such as passengers and other road users. Three respondents indicted that FOTs should involve and benefit all stakeholders, and partners in FOT studies should not only promote their own solutions. FOTs on the affordability of new technologies in order to avoid or minimise social inequalities is an issue that has been raised by one respondent.

The main privacy constraints identified by nearly all the participants are confidentiality and anonymity of data. Data protection is also mentioned as well as the question of who owns the data. Data that pose problems in the area of privacy are those pertaining to the FOT participant and on the location of his/her car at a certain time. A special point for attention is data that may be used against a driver, such as in accidents.

The main legal constraint identified is liability. Many respondents are concerned with the question of what happens when an accident occurs during a FOT, who is responsible and what will happen to the data collected. Several respondents also mention insurance issues. Another important issue is the privacy of data. Respondents also stress the issue of the safety of systems, both of the system and the installation of the system, especially for systems which are not yet type-approved. A practical problem in planning FOTs is the fact that different European countries have different legal constraints.

Technical constraints are identified in two main areas: the system and the data. Systems should be reliable and properly installed. A special concern is that the results of a FOT may be outdated because systems change so rapidly. The data acquisition and analysis is seen by many respondents as problematic. The data to be collected in FOTs are complex and the size of a data set may be very large. Data collection should be planned carefully in order to ensure secure and reliable data.

From the answers on the different constraints the conclusion may be drawn that there are major concerns about the acquisition and handling of data. Ethical, privacy, legal and technical constraints consist that may make the planning and performing of FOTs difficult. In planning tests, these issues should be considered and taken care of. The risks for participating drivers are also a concern. Next to privacy risks related to data acquisition, safety and liability also exist. Testing systems that are mature and/or type-rated may be a solution to ensure safe driving, but testing prototypes in FOTs may be useful or even necessary to ensure future safety. The problem of liability needs to be solved before a FOT can be started. It should be clear beforehand what the responsibilities are of drivers, manufacturers, installers and researchers in case of accidents.
1.3.2 Funding

The question on the level of co-funding by the European Commission for different types of activities performed in FOTs is mostly answered with 50%, including 100% of the material costs. For most types of FOT studies 50% funding is most often mentioned (70%). A small majority of these respondents also wants the material costs funded at 100%. These material costs are incentives for buyers of equipped vehicles (45%), data acquisition performed on equipped vehicles bought by customers (44%), prototype costs for tests with users on prototypes or equipped vehicles on public roads (39%) and specific equipment for performing FOTs for tests on private tracks. Not many respondents opt for 100% funding (8-21%). The few respondents who filled in an amount of their own choice mostly opted for 75%. The 21 respondents who chose a percentage above 50% gave as reasons that research institutes do not have their own funds to perform this kind of research and that the outcomes are of general and public interest. Several respondents point out that the equipment, including for data collection, may be very expensive.
1.4 In vehicle, cooperative, nomadic device based systems and services to be used in FOTs

Section 9 of the questionnaire.

The questions in this part were answered by 40-53 respondents from all stakeholder groups.

In this section 44 systems and services were proposed and the respondents were asked to select the most appropriate FOT method and locations. Appropriateness was judged in terms of geographic area, demographic groups and the long-term behavioural impact on drivers. Together this gave a large amount of data which we will not discuss in full, but the major tendencies will be provided.

Systems that were added by respondents are: collision mitigation, lane change assistance, passive safety (crash test, energy dissipation test, test of radii), installation tests (airbag, indicator warning lamp, field of vision, EMC), and most likely path estimation.

1.4.1 Method

Concerning the FOT method, differences between the three methods proposed (questionnaire, data acquisition and driver monitoring) are often not large. For most respondents and for most systems, data acquisition seems to be the best method (30 systems scored highest on this method, with scores between 36-82%). There are large majorities for systems that work automatically, and are hard to observe by either the driver or a researcher, such as roll stability control system. For 10 systems, questionnaires are seen as the most appropriate (37-68%). In general one could say that questionnaires are useful for those systems that relate to events that are consciously used or experienced by the driver, such as alcohol interlock and eToll, or are used only very rarely but in a significant situation, such as eCall or antitheft. Driver monitoring only gets the support of the majority for systems that are related to directly observable behaviour, such as driver support in merging traffic or attention control systems. Although data monitoring is most popular, for most of the systems, an important percentage of the participants sees a role for questionnaires and driver monitoring. It is remarkable that for every system there is at least 1 respondent who thinks that one of the three methods is the most appropriate.

1.4.2 FOT location

For every system, and by a large majority of the respondents, the public road is always seen as the most appropriate place to conduct FOTs, and not the test track (68-100%). Only braking systems (antilock braking system, brake assistance, ESP/ESC) receive a percentage under 70% (68-69%). This is probably because emergency braking is dangerous in real life and may therefore sometimes be better, or more easily studied on a test track. The large majority advocating the public road does not come as a surprise because many respondents want to use the FOT for reasons of understanding real-life situations better, and over longer periods of time.

1.4.3 Geographic area

For the majority of the systems, performing FOTs in specific geographic areas is more often seen as not important (28 systems). However, majorities are often not very large (50-81%). The systems that receive more than 70% concern systems that have obviously no direct relation with an area:
adaptive brake light, antilock braking system, event data recorder, and perceive vehicle surrounding. Systems that receive the majority for taking geographic area into account are often concerned with situations that have a direct relation to a geographic area (such as real-time traffic information, dangerous intersections and school zones, infrastructure-based warning systems).

1.4.4 Demography

For the appropriateness of performing FOTs on a specific demographical group, respondents say no far more often than yes (for 38 systems). However, there are again usually no large majorities (50-82%). The only systems that get a majority over 70% are: antitheft system, eToll, inter-vehicle hazard warning, local danger warning, and perceive vehicle surroundings. It is not easy to explain why FOTs of especially these systems should not be performed on specific demographic groups.

The only systems that get a majority over 70% are: alcohol lock, antitheft system, eToll, inter-vehicle hazard warning, local danger warning, and perceive vehicle surroundings. It is not easy to explain why FOTs of especially these systems should not be performed on specific demographic groups.

Only a few specific systems, which are obviously related to certain groups receive a large yes (alcohol lock, presumably for young drivers or offenders). Although many studies showed different kinds of use by different driver groups, the majority of the respondents of the questionnaire do not think it appropriate to perform FOTs on specific demographic groups. An explanation may be that for many respondents FOTs are meant to study real-life driving by ordinary drivers and not targeting only specific groups.

1.4.5 Behaviour (long term effect)

A large majority of the respondents thinks that FOTs should evaluate the long-term effects on driver behaviour (56-100%). Only three systems get less than 70%: eToll, event data recorder, and perceiving vehicle surroundings. The exceptions that receive a majority on No are eCall and antitheft system (54-56%). This may be explained by the fact that they are systems which operate only in exceptional situations, and are not used by many drivers. As long term effects are often seen as an important aspect of FOTs (and one which has not been given much attention so far), the answers of the respondents do not come as a surprise.

In general it is clear from the outcomes above that the best method and the things to take into account in a FOT study (such as geography and demographic groups) depends very much on the specifics of systems and the questions to be answered by the FOT.

1.4.6 Needs for FOT

The question of why these systems or services need FOTs to evaluate their benefits on safety, mobility, driving comfort, environment and competitiveness is a complex one and the answers vary widely. The majority of respondents are of the opinion that FOTs may provide better data, allowing them to better understand driver behaviour and to improve the systems. FOTs are needed because they:

- Study naturalistic driving of ordinary drivers in normal traffic;
- Allow for studying long-term effects;
- Allow for large-scale studies and large data set.
Several respondents have high expectations of FOTs, and are of the opinion that FOTs will provide quantitative data to prove the benefits and shortcomings of systems and produce convincing results on the different kinds of benefit.

On the question of the level of maturity of systems and services to be tested, a third of the respondents answered “when they are commercially available” and another third “when pre-production prototypes are available”. 20% answered “when technological prototypes are advanced”. The other respondents chose the option “other” and specified that it depends or preferred a product ready for the market.

So in general there is a strong tendency towards using mature products in FOTs. The reason for this is in both the nature of a FOT as seen by many respondents (naturalistic and large scale) and the risks involved in performing FOTs with immature products (see also the questions on ethical and legal constraints).

### 1.4.7 Questions to be answered by FOTs

There is a large variety in the crucial questions that respondents want FOTs to answer. Most of the questions to be answered are related to the impact on:

- Safety
- Environment
- Traffic
- Mobility
- Driver behaviour
- Long-term adaptation
- User acceptance, customer satisfaction and willingness to pay
- Costs-benefits
- System performance and quality
- Comfort
- Market competitiveness, comparison of systems

### 1.4.8 Dissemination of FOTs results

The best way to disseminate FOTs results to related stakeholders are by producing public reports available on the web (77%). 59% also answered papers in conferences. Given the large amount of respondents from research institutes this is no surprise. What is interesting is that 60% also answered the open question on other means. Most of these means concern public media like television, radio, newspapers and magazines. Also, seminars, forums, exhibitions, show cases and public events are mentioned. Research exchange could be done by databases accessible to all interested parties. The fact that these respondents are wanting to broadcast the results may indicate that they see FOT as a method giving results that are unambiguous and that can be fed directly to the public. In the words of one respondent: “Tell them”.

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1.5 Business models

Section 10 of the questionnaire.

The questions in this part were answered by 40-58 respondents from all stakeholder groups.

The great majority of respondents see FOT results as relevant to develop business cases and cost-benefits analyses to support the industrial development of new systems, services and functions, and to plan strategies for promotion (90%).

Although a variety of answers are given on the question of why FOT results are relevant for business processes, the answer are mostly related to the answers given on the question on the crucial questions to be answered by FOTs. As one respondent answered “Obvious!” The results of FOTs are seen as having a high value and as highly interesting. The high quality of data coming from FOTs allow business issues to be addressed more effectively. FOTs may provide convincing results that can be used to promote products and convince customers.

1.6 Concluding remarks

The respondents see FOTs as a good means to reply to a wide range of questions. The results will provide a strong support in better understanding driver behaviour and in improving systems, services and policies. Both social and commercial interests will benefit from FOTs results. Respondents see FOTs as a good method to gather information because it brings a wealth of information on everyday driving behaviour of normal drivers, on the long-term effects of system use and on the strong and weak points of systems.

Planning FOTs is an important and rather complex process. There are a lot of factors to take into account relating to privacy, liability and user acceptance. The collection and analysis of large sets of data is a point of concern. The systems to be tested need to work correctly, and need to have a relatively high level of maturity. Automatic data collection is highly advantageous for FOTs, but driver observation and questionnaires can sometimes be used as well.

The results from FOTs need to be disseminated broadly, both to stakeholders and to the general public.

(See for further conclusions Chapter 3).
2 Legal and ethical issues of FOTs

The aim of chapter 2 in this deliverable (D6.3) is to sensitise the reader to the legal issues that will prove to be relevant in planning and carrying out a Field Operational Test (FOT) according to present law and legislation. Due to the fact that the details of future field tests cannot be foreseen, all obviously relevant legal areas will be covered. Abstract information on FOTs is provided and neither completeness nor accuracy can be guaranteed for the concrete future testing. Considering the legal importance of details in test arrangements, it must be pointed out that it is vital to involve legal expertise from the country in question when planning a Field Operational Test. The overview given here can, furthermore, not substitute for legal advice in a particular case. This overview is therefore merely meant to be an indication of what definitely must be considered and should allow for a first orientation on what to take into account when planning a FOT.

For the purpose of well-structured information, a table has been included in sub-chapter 2.1. In this table a classification in terms of system design and superior legal aspects is illustrated. Each segment refers to relevant sub-chapters that deliver respective information. The table is merely meant for fast reading.
## 2.1 Table: Overview of relevant issues in relation to system design

<table>
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<th>Legal issues</th>
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<th>Administrative fines</th>
<th>Data privacy</th>
<th>Insurance licensing requirements</th>
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<tbody>
<tr>
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<td>2.7/2.7.1/2.7.2/2.7.3</td>
</tr>
<tr>
<td>informing</td>
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<td>2.4.1</td>
<td>as above</td>
<td>as above</td>
<td>as above</td>
</tr>
<tr>
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<td>2.4.2</td>
<td>as above</td>
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<td>as above</td>
</tr>
<tr>
<td>intervening/non-overrideable</td>
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<td>cooperative systems</td>
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</tr>
</tbody>
</table>

Table 1: Overview of relevant issues in relation to system design
2.2 Introduction

Before the legal issues related to FOTs are discussed in detail, it must be pointed out for the purpose of this deliverable, that an FOT will usually be a test arrangement that is accomplished under real-life traffic conditions. This implies that an unknown number of people not involved in the actual testing procedure, form the surrounding traffic. Usually third parties will not know about the testing being performed. Thus this first characteristic feature excludes artificial, isolated test arrangements and has important legal implications over all legal issues in question.

Another legally important feature of a FOT is the responsibility of those in charge for safe test design and the existence of a contractual relationship with the test participant. The information provided in this respect is therefore of great importance.

2.3 Information for test participants (briefing) / contractual agreements

As already mentioned in sub-chapter 2.2, the legal relationship between the organisation carrying out the field test and the test participant will most likely have to be agreed upon in a contract (that may just as well be described as a “letter of agreement”, as the term “contract” might deter potential test participants). Apart from the contract/ letter of agreement itself, further legal implications may come about under tort law. Any kind of information provided to the test participant (written documents, presentations, the contract/ letter of agreement itself, individual briefing, etc.) may influence liability in case of an accident.

Apart from this, a characteristic feature of field operational testing is data acquisition. In some way the driving will be recorded; possibly even the location might be tracked or videos of the driver and/or surrounding traffic recorded. This has an influence in terms of test participants’ and third persons’ data privacy and will partially be subject to consent on their side.

2.3.1 Preliminary considerations

To give substantial legal advice on exactly which information must be provided to test participants and estimate which arrangements (insurance, exceptional licenses, etc.) are necessary, rather detailed knowledge on the experimental setup and the systems to be evaluated is required. In order to conclude a contract/ letter of agreement with test participants, very detailed knowledge on the exact test design and testing procedure is necessary (and this at an early stage of the FOT).

As certain legal consequences may turn out to be unwanted, the following should be taken into account right from the beginning in order to adjust the design of the FOT accordingly.

2.3.2 Information provided to test participants

In order to obtain a valid consent from the driver to log the data and allow for safe participation in the FOT, information on the testing procedure and setup must be comprehensive. The participants do not need to understand the underlying technology in detail but do need to understand the implications of the technology for them so that they can take informed responsibility. This will make the provision of information necessary on which kind of data is being logged in the first place and who will have access (esp. in case of accidents, administrative fines, etc. this will be important (cp.
sections 2.3.2.2; 2.4; 2.5.4; 2.5.6 and elsewhere). Possible legal consequences in case of dangerous driving by the test participant should be specified (like possible recourse in case of grossly negligent or intentional behaviour – if applicable (and considered appropriate)). Special attention must be paid towards limitations and how to deal with malfunctions (the two must be distinguished, cp. 2.3.2.1; 2.3.2.2). The same must be considered in case of a possible overload of the driver in terms of information, warnings, etc. That the responsibility for safe use as for administrative fines remains with the driver must be pointed out explicitly (cp. chapter 2.4) as must be the fact that the driver remains fully responsible for his/her driving and is not exempt from full responsibility due to participation in the FOT (this may not fully be applicable in case of non-overrideable systems, however, this will lead to many further questions, cp. chapter 2.8.). [cp. REGAN, 2006, VOL 2]

Apart from this, the effect of the systems on driving – especially in case of some kind of unusual interference – should be pointed out, too. (This might be the case e.g. when applying a visual, acoustic or haptic warning-strategy that might unsettle the driver. [REGAN, 2006, VOL 2] Special information is particularly advisable in case of any interference into steering or braking, etc.). The risk here is to not sufficiently prepare the test participants for safe use of the system. This may under certain conditions lead to liability of the responsible research scientist/ head of department and possibly to liability of the organisation (if possible according to national tort law). Apart from this, a researcher (even negligently) causing damage to the health of a test participant may be considered criminally liable for unsafe test design, insufficient instructions and many further substantial breaches of his responsibility with obviously negative connotations for safety.

In case the FOT is taken out under real-life traffic conditions and without further surveillance, a great amount of information on safe use is needed. In this case (real-life traffic, no surveillance and no immediately obtainable support) the accurate information as is typically given in a driver’s manual will serve as good guidance of what should be provided. Thereby, reasonably foreseeable misuse must be taken into account as well. The information should be provided in a way that the least informed test-participant, who is therefore most exposed to a danger, can drive safely. The provision of information and warnings can, however, be achieved otherwise than in a written manual: Personal briefing, presentations on how to handle a system under certain conditions or the training of drivers with the possibility to experience the functioning and ask questions are legally sufficient as well. The possibility to ask questions at any time later during the FOT should be provided for e.g. by means of a telephone hotline (again in order to avoid insufficient briefing which may result in unsafe use by test participants). Furthermore, it might ex post turn out to be difficult to prove that a certain piece of information (that would have been necessary to avoid an accident) has actually been provided to the respective test participant. Therefore it seems advisable to incorporate at least the most important information into the contract/ letter of agreement with a test participant in form of some kind of notice or to refer to another document that has made the information available. [cp. REGAN, 2006, VOL 2]

### 2.3.2.1 Information on system limitations

A special issue in the context of briefing are system limitations. System limitations are those features of a system that are not a defect but still lead to wrong information or an erroneous intervention due to a lack of overall system intelligence.

**Example 2.3.2.1a:** An informing speed alert system is based on the current data concerning speed limits. However, the system does not take recent changes or speed limits due to road works into account. This is because the information cannot be obtained in a very current manner, specific speed information on road works is not available at all and the system is technically not capable of road side traffic-sign-recognitation. These system limitations should be explained to the driver in order to influence his/her expectations as to what the system is capable of. (Apart from this it will in this case be necessary to advise the driver that only the information provided by traffic signs is legally binding (in terms of the road traffic code) so that it lies

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within the responsibility of the driver to obey the sign-posted limit and not to rely solely on the information provided by a speed-alert system.)

Example 2.3.2.1b: A lateral guidance system is based on the recognition of road markings. No assistance can therefore be provided in case road markings are missing, e.g. due to recent road works. This would be considered a system limitation too, so the dependence of the system functioning on road markings must be explained to test participants. (In contrast to this, a defect/malfunction would in this case be given in case e.g. a sensor fails to identify a visible road marking).

Example 2.3.2.1c: A parking-assist system is capable of detecting the car behind but may not reliably detect rear objects such as children. This too is a system limitation. The driver needs to know about this limitation. Hence the driver must be informed what the system can and what it can’t detect and warn the driver about.

As system limitations always occur in certain situations, they are predictable and will not bring about liability issues as long as they have been made sufficiently clear to the test participant. A test participant able to anticipate the system-behaviour in case of all system limitations will in this respect be considered well informed.

2.3.2.2 Information on possible malfunctions

In case the FOT is conducted to evaluate a pre-production system, possible malfunctions will usually have to be taken into account too. Most important in case of malfunctions will again be to give test participants all the information necessary. That is first of all to provide the information, that a malfunction can occur and instruct thoroughly how to deal with the resulting situations [REGAN, 2006, VOL 2]. If technically feasible, recognisability of malfunctions should be made possible. In most cases it will be sufficient to provide for the possibility to switch off the system and thus ensure safety. Even this might not be necessary as long as the malfunction will not impair safe driving at all. In case of intervening systems, however, much depends on the period of time available for a reaction of the driver: If this is too short, safety will potentially be impaired by any (disturbing) intervention.

2.3.2.2.1 Intervening systems

In case of intervening systems the negative effect on driving might be very severe. If possible, the system should provide for an immediate, automatic “switch-off” (if this is a safe option) and most certainly this should be rapidly and easily manually accessible for the test participants in case of a malfunction. It might be a good idea in terms of due diligence not only to provide information on how to react in this situation, but even to train the driver appropriately and, at the same time, only allow for the participation of test-participants that easily come to terms with such an interference provoked by a malfunction (i.e. continue to drive safely, if confronted with the malfunction). As pointed out above, the period of time available for a reaction of the driver must in every situation be sufficient to allow for his/her intervention. Only if this safe take-over by the driver is provided for, a FOT in real traffic can be considered.

In case of non-overrideable systems, only such malfunctions can be tolerated in the first place that have no effect whatsoever on safe driving. Apart from this, there must be very good reasons not to allow for a manual "switch-off"-function for the purpose of a FOT in case of premature, non-overrideable systems (presuming that premature systems comprise a higher danger of malfunctions than fully developed systems would.) It must be taken into consideration that the only theoretical possibility to override such an intervention of a system will not be regarded legally sufficient (e.g. this may be the case, if the time left to a driver in order to regain full control is too short, possibly even below human response time). In case of non-overrideable systems see chapter 2.8.
2.3.2.2 Cooperative systems

Cooperative systems – in terms of safe use – take effect either by informing the driver or intervening. As far as malfunctions are concerned, the same will apply to cooperative systems according to their respective functioning mode (cp. chapter 2.3.2.2.; 2.3.2.2.1).

2.3.2.3 Information on data recording

As far as data privacy is concerned, details are provided in a separate chapter (cp. 2.5). For the briefing of test participants it is important to point out the relevant issues for data processing as well as access rights [REGAN, 2006, VOL 2].

It is legally required that the driver knows which data is being logged. It should also be pointed out, which conclusions can be drawn from the data available (as far as possibly foreseeable) and this should involve all imaginable data sources and their combination (including external sources that can be resorted to). The meaning of anonymisation and pseudonymisation as well as any other measures to achieve data privacy should be described too. In case de-personalisation of data is possible and intended, it must be pointed out at which point of data-handling this is realised.

Example 2.3.2.3a: Within a FOT, data on speed as well as location is recorded. It is possible to anonymise the data for scientific use. However, when logging the data in the car, it can naturally be traced back to the driver (even if personal information is not logged). In this case, anonymisation might come into effect as soon as the data is read into a database with many similar recordings so that retraceability of the test participant is barred. Retraceability would also be barred, in case the advice in chapter 2.5.4 is applied, however, the risks of accessibility in spite of these measures (cp. chapter 2.5.6) – e.g. until pseudonymisation has been realised – should be pointed out too (in order to avoid incomplete information).

The most important measure to comply with data privacy regulations will be to inform the test participant thoroughly as far as data acquisition is concerned and (voluntarily!) gain his/ her consent. This consent must – due to the considerable impairment of data privacy combined with FOTs – be stipulated in written form. For all further details and advice, cp. chapter 2.5 of this report.

2.3.3 Agreements on cost allocation and liabilities (including insurance issues)

Another important aspect in terms of contractual agreements is the allocation of costs as well as special agreements in terms of liability. Some aspects will most certainly be regarded appropriate; some might seem disadvantageous in light of volunteer recruitment for a FOT. However, the possibilities in terms of contractual agreements are broad as long as true freedom of decision is ensured (and participation must be voluntary anyway).

Appropriate agreements within a FOT will e.g. presumably be agreements on the allocation of fuel costs that will be borne by the test participant. It may furthermore be regarded adequate to agree on a certain sum per mileage for the use of the test vehicle (as long as the vehicle can be employed in every day use). This again may be combined with other agreements – in case of long term testing – within a lease contract, etc. [REGAN, 2006, VOL 1].
Of great importance in so far will be the agreements concerning the presumably valuable equipment for data acquisition (and possibly the units installed for evaluation). Here agreements on liability might be necessary as might be a special insurance in order to avoid a financial strain on the test participant (and solve this conflict pragmatically). See chapter 2.6.

Special agreements will be necessary on data provision by the test participants. As this will mostly be personal data, it shall in so far be referred to chapter 2.5. However, it should be noted that apart from all the agreements necessary in terms of data privacy itself, agreements will also be necessary on how often data shall be retrieved, how this shall take place and the whereabouts of e.g. vehicle return, possibly the demounting of data acquisition components or systems (in case the vehicle remains in the property of the test participant). In the latter case special attention must also be paid to possible damages brought about by installation of the FOT-equipment and how these shall be dealt with [REGAN, 2006, VOL 2].

In case the vehicle does not belong to the property of the test participants, special agreements might be necessary in order to assure that the car is not used for dangerous driving. This will be evident from the data retrieved and in severe cases an obligation to intervene might even be brought about as the knowledge on the side of the researcher is evident (and the participation in a FOT might even provoke dangerous driving depending on the test-participant’s character). Therefore an appropriate contractual obligation may be stipulated by agreeing on immediate termination of testing, in case dangerous driving is observed [REGAN, 2006, VOL 2]. However, it must be pointed out that this knowledge on dangerous driving usually belongs to the private sphere of the person concerned. In case this knowledge would e.g. be disclosed towards the employer, this would severely compromise the test participant and must therefore be dealt with in compliance with the guidelines depicted below (cp. chapter 2.5). Any disclosure to third parties must therefore – all the more – be refrained from.

Another important aspect in terms of liability of the researcher is to ensure that the test-participant is fit to participate in the FOT. This will definitely not imply any detailed inquiries as far as health is concerned (and this would even be considered intimate knowledge in terms of data privacy). Yet, the researcher should not allow a test participant to take part in case an unfavourable medical condition is obvious. Apart from this, it might be a good idea to enlighten the need of good health in the FOT information provided (especially e.g. as far as eyesight is concerned) and this might also be included in the contract/ letter of agreement dealing with all the details of FOT-participation. The same is true for any substance abuse [cp. REGAN, 2006, VOL 1].

Furthermore, information should be provided on the insurances concluded for the test vehicle (in order to point out remaining risks). Depending on the FOT model chosen, this might, of course, only be a recommendation to the test participant on which insurances should be concluded (and may even be left completely to the test participant in case the systems to be evaluated are mature, in no way critical and the test participant owns the vehicle participating in the FOT). Special attention must be paid towards the insurance of data-logging equipment and special agreements might have to be made/ insurance issues pointed out to provide for sufficient information. (cp. chapter 2.6.3)

2.4 Administrative fines

In Germany, administrative fines are related to the personal responsibility of the perpetrator. If traditional driving is considered, no doubts exist on whether responsibility for any breach of traffic law remains with the vehicle driver. However, even systems that only provide information to the driver, tend to point out that traffic rules and traffic signs have priority to information provided by in...
vehicle systems (e.g. the case with navigation systems). Therefore the following possibilities for system-design must be considered separately:

### 2.4.1 Informing Systems

As far as informing systems are concerned, two different types of information must be distinguished. First of all, information may be (more or less) legally irrelevant (e.g. a system providing information on present fuel consumption). Often, especially in case of safety-relevant ADAS, the information will, however, be legally relevant after all. Here again a distinction must be made: On the one hand there is information e.g. on legal speed limits, sign-posted dangerous bends or information provided by road traffic codes. This kind of information has a direct legal implication as it is directly linked to the provisions of road traffic and thus to the conduct legally required. On the other hand, the information that lacks this direct link, may become legally important e.g. in terms of a compensation for damages. The latter is, however, much subject to the contractual agreement and information provided to the test participant (for further information on this, cp. chapter 2.3).

As far as those informing systems are concerned that have been circumscribed to be directly linked to the provisions of road traffic, the question might arise, whether false information provided by the system will excuse or charge (as the case may be) the driver in terms of an administrative fine.

**Example 2.4.1a:** The driver negligently misses a sign-posted speed limit of 50 km per hour at the road side. His car is equipped with a speed alert system so he checks the speed limit displayed there. For some reason the information provided is, however, wrong; a speed limit of 70 km per hour is displayed. The driver relies on the information of his system and drives at 70 km per hour. The driver is fined for speeding.

In terms of administrative fines it does not matter how the driver has been instructed (at least, if the driver has been aware of the fact that he must generally comply with traffic rules when taking part in the FOT – this information must be provided to the test participant, cp. Section 2.3.). In example 2.4.1a it can be expected from the driver to adhere to traffic signs: Only traffic codes and sign-posted traffic information are legally relevant (no in-vehicle-applications have been introduced in a legally relevant way so far). Because the driver misses the sign-posted speed limit negligently, he can be charged for speeding. All the other information (such as the display of the speed alert system) has no legal implication (it is only a factual “add-on”-information). So even though the driver in example 2.4.1a only relies on the wrong information displayed, this will not excuse him legally in a way that the fine cannot be imposed on him [ALBRECHT, 2005].

**Example 2.4.1b:** The driver is speeding and is additionally warned by a speed alert system that he is going too fast. Due to data collection in the car, the display and acoustical signal of the speed-limit warning is recorded. As a camera is also installed, it can be proved that the driver has noticed the warning provided on the display. However, the driver does not reduce his speed and is fined.

In example 2.4.1b the driver is – apart from the sign post or general traffic rule – additionally warned by the in-vehicle-application (such as a “speed alert” system) and has obviously been aware of the speed limit. Therefore his breach of traffic law might be considered intentional, which may have effect on the height/amount of the fine: In Germany e.g. it is generally assumed that speeding is a negligent act. In case intention can be proved – which would be promising given all the data recorded here – the fine will turn out to be higher [ALBRECHT, 2005]. This problem is also dealt with in Section 2.5 (data privacy issues) as far as data usage in terms of prosecution is concerned. In case it proves to be necessary to record this data, the test participant concerned (driver) must at least be aware of the risk he is running (which is again subject to the information provided by the organiser of the FOT).
2.4.2 Intervening, overrideable systems

As far as intervening, overrideable systems are concerned, most important is to point out that they must be actually overrideable in any case and at any time (otherwise cp. Section 2.4.3). If they are overrideable, the driver is still fully responsible for every movement of his vehicle. Usually the intervention will either serve as a basis for information transmission (e.g. vibration of the steering wheel) or will simply intervene by carrying out (a part of the) driving task automatically (e.g. an Adaptive Cruise Control). As far as the transmission of information is concerned, the same will apply in terms of fines (this has been discussed in section 2.4.1, cp. above).

In case the driving task is partially carried out automatically, the system limitations and functioning of the system must be made completely clear (to provide for full control over the vehicle) and it must be pointed out that the responsibility – even for the aspect of the driving task carried out by the system – remains with the driver. It is therefore necessary to override the system, if this is legally required (and this must, of course, be possible!). All this is subject to the information provided to the test participant (cp. section 2.3). As full control over the vehicle will then still be immediately available, administrative fines can be imposed on the driver in case of a negligent or intentional breach of traffic law.

2.4.3 Intervening, non-overrideable systems

In case of intervening, non-overrideable systems, it should for the means of this report briefly be pointed out that these are generally considered non-permissible and call for exceptional licenses and a specific insurance (cp. chapter 2.8 and 2.6.4 for details).

Apart from this, the driver is no longer capable of (fully) putting his will into execution as far as the control over his vehicle is concerned. In so far as the administrative fine arises from an aspect that no longer belongs to the drivers’ control, the breach can no longer be considered negligent or intentional. Therefore administrative fines can no longer be imposed on the driver [ALBRECHT, 2005].

2.4.4 Cooperative Systems

In case of cooperative systems many aspects may come to effect that have been discussed above in the sub-sections 2.4.1, 2.4.2, 2.4.3. The respective effect a cooperative system has within the car and the information on the cooperative system provided to the driver will then be respectively valid here. In other words, the same will then apply to cooperative systems.
2.5 Data privacy

2.5.1 Introduction/ general comments/ minimum standard within the EU

Data privacy is in Germany based on basic (constitutional) human rights (for Germany: Art. 1 para. 1 and Art. 2 para. 1 “Grundgesetz”= German constitution), so called “informational self-determination” (“informationelle Selbstbestimmung”). The Federal Constitutional Court of Germany characterises this basic human right as the authority of the individual to decide on the disclosure and use of his/ her personal data. The Federal Constitutional court argues that who cannot overlook which personal information is available in certain fields of his/ her social environment and therefore cannot estimate the knowledge of contact persons, may substantially be hindered to exercise his/ her personal freedom of free decision and planning. This is the main idea underlying the basic human right of “informational self-determination”. This should at the same time well circumscribe the scope of protection data privacy acts bring about (the laws “form” or “shape” the basic human (constitutional) right as far as legally permissible without touching the core areas protected by the constitution) [BfD-INFO 1, 2002].

Within Europe, the minimum standard of data privacy (“data protection”) is stipulated by the EU Directive 95/46/EG. This directive was issued in 1995 to ensure data privacy of natural persons in the processing of personal data. In case of electronic telecommunication, the Directive on privacy and electronic communications (2002/58/EG) must be considered preferentially. The directive 95/46/EG is, however, of greater relevance for FOTs in general, as FOTs only might involve electronic communication. Yet, this is not necessarily the case. Therefore the Directive 95/46/EG describes the minimum standard for data protection that must be guaranteed throughout the EU by national law (the directive itself is generally not directly exercisable – the same applies to the directive 2002/58/EG). In Germany the directive 95/46/EG lead to some modifications of national data protection acts such as the “Bundesdatenschutzgesetz” (BDSG). [BfD-INFO 1, 2002], [ROSSNAGEL, 2003].

The extent of protection by data privacy acts in Germany is rather dense. If therefore the data protection principles valid for Germany can be applied to the design of a FOT, it is most likely that this will be sufficient in terms of data protection for other countries of the EU too. However, it must be pointed out that the following statements can only claim definite validity for FOTs in Germany. In case of doubt, it seems advisable to contact the national data protection officer (if applicable for the respective country) for further advice (the same applies in case of any specific questions). It must also be pointed out that the standard of data protection – in certain points – might turn out to be lower in other EU-countries than it presently is in Germany. The standard should, however, not drop below the minimum standard described in the EU directive mentioned above. Therefore this minimum standard must be complied with, especially when taking out a FOT within an EU research activity. The minimum standard from the EU directive has also been referred to as far as possible.

2.5.2 Legally relevant data and general measures to ensure data privacy

Data privacy regulations are generally based on basic human rights. Therefore the scope of relevant data is restricted to personal data. Personal data are particulars on personal or factual relations of a defined or definable person. In some European Countries (Austria, Luxembourg, Denmark) even legal bodies are covered by data protection rules. However, as regards FOTs, only data privacy of natural persons will be touched (cp. Sec. 3 BDSG, Art. 3 EU Directive 95/46/EG).
Example 2.5.2a: Location data is being logged in a car equipped with a GPS unit. In this case the mere location data can be considered personal data as soon as it can be brought together with knowledge on car occupants: The location is then related to a certain person (aggregated data) and will therefore be considered to be “personal data”.

Anonymisation and pseudonymisation are measures to assure data privacy.

Anonymisation is the de-personalisation (a modification) of personal data. The data can then not be traced back to the natural person. However, it must be kept in mind that complete anonymity cannot be achieved, in case the data is so particular that it will apply to only one person. Whether a data set can be considered anonymous may be dependent on the number of particulars saved, the available methodological and mathematical instruments as well as the availability of additional information allowing re-personalisation. Therefore, anonymity must be considered a relative term.

In case of pseudonymisation the name or other identification criteria of a person is modified and replaced by a pseudonym (usually a multi-digit number, nick-name or combination of numbers and letters, the so called “code”). This will considerably complicate the identification of the person behind a data-set. However, in contrast to anonymisation the re-identification remains possible (and is not restricted to chance, mathematical or methodological instruments). With the help of the key that has been separated from the original data set – possibly a list linking the names to the code – re-identification can be achieved. The protection of privacy is much dependent on how well the separation of the key and data-set is ensured. If the key is destroyed, the data would be considered anonymised [ROSSNAGEL, 2003].

2.5.3 Sub-constitutional law and general principles

For Germany the basic right of informational self determination has been further developed in sub-constitutional law. Such is the federal law on data privacy (“Bundesdatenschutzgesetz (BDSG)”) as well as respective acts in every single federal state. Depending on the background of the organisation taking out the FOT (company (= private) or public authority) different measures are applied in terms of data privacy. For the purpose of this report, the description of legal framework will focus on the BDSG as this code is generally applicable in case of data privacy for private organisations (companies, etc.) and valid for all federal public bodies (does, however, not apply to the public bodies within the federal states which are large in number: for these the respective act in the respective federal state is applicable. The provisions tend to be very similar, though) [BfD-INFO 1, 2002].

As a rule of thumb, the provisions are, generally speaking, rather strict in case of data acquisition, processing and use by public bodies and more liberal in case of (private) companies. Speaking for Germany, this leads to the situation that only those private companies, institutions, etc. are subject to the federal law on data privacy that collect, process or use data by means of data processing equipment (automated or not). The use of personal data in any other way e.g. by private entities is not subject to the act in the first place. However, data processing equipment will be the rule for field operational testing, so data privacy restrictions will in so far be applicable.

The basic principle of data privacy provisions in Germany is that any form of data acquisition and processing is interdicted, if not subject to explicit authorization within the same act (or some regulation by special law) [BfD-INFO 1, 2002].
2.5.3.1 Consent of test participants

Based on the provision that data acquisition and processing is generally interdicted, the most important exception from this rule for FOTs is the consent of the person concerned (cp. Sec. 4 and 4a BDSG, Art. 7 and 10 EU Directive 95/46/EG). For any consent given in terms of data acquisition, processing or use, the person concerned must:

- make this statement in written form (unless certain circumstances – e.g. conclusion of a contract by means of electronic questionnaires over the internet, etc. – make any other form necessary)
- the consequences must be clarified (intended purpose of acquisition/processing/use), including the consequences, if consent is not given
- the consent must even be specially highlighted, if the consent to data acquisition/processing/use is issued together with other statements (consent to the use, etc. of data concerning health – which might be of interest for FOTs – will call for a special (separate) consent in this respect)
- consent must always be given voluntarily!

[BfD-INFO 1, 2002]

2.5.3.2 Principle of purpose limitation

Another important principle is purpose limitation (Sec. 14, 28, 29 BDSG; Art. 6 EU Directive 95/46/EG). This means that data may only be processed for the same purpose it has been collected for (or saved, in case prior acquisition is non-applicable).

However, the act comprises a number of exceptions to this rule. As far as (possibly) relevant for a FOT, acquisition, processing and use of data is not limited to the same purpose (Sec. 14 BDSG valid for public administration and Sec. 28 BDSG for private bodies) when

- the person concerned gives his/her consent to further use,
- the purpose of further use is criminal prosecution (the same will apply in case of an administrative offence) or
- the purpose of further use is scientific research that – from an objective point of view – outweighs the individual interest in data privacy of the person concerned and the purpose of scientific research cannot be achieved otherwise (or only by applying disproportionate effort).

It will prove difficult to estimate whether this is the case – apart from those cases of obviously minor infringements of data privacy rights and great scientific value that cannot be achieved otherwise. Therefore, it seems advisable always to obtain the consent of the person concerned for any further – than the originally intended – data processing (cp.: Sec. 28 para. 3 No. 4 BDSG)

[BfD-INFO 1, 2002]

2.5.3.3 Data acquisition (extent and limitations)

The general principle for data acquisition is that data must be collected openly from the person concerned (and not otherwise). As far as data acquisition is taken out by a public body, this is only possible to such an extent as necessary to fulfil the legitimate tasks (Sec. 4, 13, 28, 29 BDSG; Art.
5-7 EU Directive 95/46/EG). The relevant limitations for private entities in case of a FOT are in so far

- specified in the contract/ letter of agreement on which data acquisition is based
- restricted to explicit consent in case of intimate and very private data (such as racial and ethnic background, political opinion, religious and philosophical belief, health and sex life). Especially data on the health and personality of a test participant might be important for the FOT. The acquisition will most likely prove permissible again for the reason of research: here data acquisition will have to meet the legal principle of proportionality to be considered legitimate. (Data acquisition will – according to the legal principle of proportionality – then be considered legitimate, if it is concordant with an appreciation of the higher and therefore more valuable legal right. The two conflicting rights in a FOT will generally be informational self determination and research.) (cp. Art. 8 EU Directive 95/46/EG).

Apart from this, data acquisition is also limited by the principle of data economy (Sec. 3a BDSG). This is to say that no more personal data shall be collected and saved than is really necessary to fulfil the purpose in question (i.e. any unnecessary data compilation shall be avoided).
[BfD-INFO 1, 2002]

2.5.3.4 Technical and organisational measures

An important and rather costly aspect of data privacy is the technical and organisational standard that must be applied. Generally speaking, those measures are necessary that will guarantee the compliance with data privacy (cp. Art. 16, 17 EU Directive 95/46/EG; Sec. 9 BDSG; Sec. 10 BDSG calls for further technical measures but concerns the automatically generated release order and should not be applicable to a FOT). What this rather general description can imply, has been stipulated in an annexe to the German data privacy act. The effort needed to ensure data privacy in case of automatic processing and usage is dependent on the character: intimate data is most strictly protected and forms the core area that may not be impaired at all (will seldom be relevant in case of FOTs), personal, private data is strongly protected and data with a relation to other people that is generally known, is the least critical. The character of the data in question indicates the effort to be applied in order to achieve reasonable care. Generally, reasonable care can be achieved by the following measures:

- Ensure that third parties have no access to data processing equipment (admission/entry control).
- Ensure that only authorised personnel can operate the data processing equipment (access control).
- Safeguard that the extent of a user’s access is granted only in so far as the respective access right reaches and that no third party can read, copy, alter or delete data (access protection).
- Safeguard that personal data that is transmitted, transferred or when saved on a data storage medium cannot be read, copied, altered or deleted by unauthorised third parties (transmission control).
- Ensure that it can ex post be determined whether (and, if so, by whom) personal data has been entered, altered or deleted (input control).
- Ensure that personal data is securely saved and cannot accidentally be destroyed (availability control).
- Ensure that data acquired for different purposes can be processed separately.
[BfD-INFO 1, 2002]
2.5.4 Data privacy in research activities

Research is in itself a basic right of constitutional weight – as is data privacy, cp. above. Therefore, an appreciation of both values must be carried out for the case in question. Research is facilitated within data protection regulations such as Art. 6, 11 and 13 Directive 95/46/EG and sec. 40 BDSG.

The regulation in sec. 40 BDSG emphasises the principle of purpose limitation to the object of research and explicitly calls for an anonymisation of data at the earliest possible stage. Until anonymisation can be achieved, the characteristics of the participant must be saved separate from the particulars on personal or factual relations and must only be brought together in case this is required by the object of research. Any publication of personal data can only be admissible in case the participant gives his/her consent (if relevant for FOTs in the first place).

However (for Germany), no right of professional discretion has been stipulated in the field of research activities (as existing e.g. concerning confidential medical communication of a medical practitioner). This has important implications within criminal law, cp. below chapter 2.5.6. This may be completely different in other countries of the EU as the Directive 95/46/EG gives sufficient leeway for a deviant regulation [ROSSNAGEL, 2003].

In order to achieve data privacy for the test participants in spite of these regulations, it has been suggested [ROSSNAGEL, 2003] to deposit data necessary for re-identification (after having pseudonymised the data) with a bearer of secrets (such as lawyers). Such a bearer of secrets can refuse to release data he/she is entrusted with. It has further been proposed to store the personal data with the (test) participant concerned [ROSSNAGEL, 2003]. This implies the risk, not to obtain the data, because the test participant might finally decide on not wanting to disclose the personal data at all. However, for a FOT this is an option to be considered: As far as the data recorded is stored within the car e.g. by means of a SD-card etc. this would allow the test participant to remove the personal data and take care of it by himself/herself (until it is handed over to the organisation taking out the research activity). The personal data is thus fully placed at the disposal of the test participant up to its voluntary release. The test participant is, therefore, free to decide upon the further use or existence of the data (and has every right to destroy the data if he/she pleases). This will avoid conflicts arising from data acquisition and balance the risks implied to a great extent. From a practical point of view it should technically be ensured that the storage medium is easily accessible and removable (and it should not be too expensive either, because the test-participant would supposedly be required to provide a replacement in case of the storage medium’s destruction).

2.5.5 Video recording

Video surveillance might be of great importance for FOTs: only knowledge from surveillance of the surrounding traffic as well as the driver can determine the impact of a system and/or reveal why a sudden driver action is necessary, etc.

The conflict arises from the high quality of video data that can be achieved by today’s technical possibilities in video recording. Additional processing of this data will therefore often reveal the personal identity. Privacy measures and regulations on data privacy in these cases are existent, but they are difficult to handle, cp. below. The problem with video data is that it is usually impossible to anonymise or pseudonymise images or even videos. This is why this data is especially ‘delicate’ in terms of data privacy and comprises great dangers. In particular, the threat that video-data might be made publicly accessible over the internet (which would be illegal, if the video contains personal data and the test participant has not granted his/her consent prior to this
release) must be considered. Such a video, however, would only then be of great interest, in case the driver or a third party behaves in a way that calls for voyeurism. As the harm to data privacy of the participant concerned (and thus his/her basic right of informational self-determination) can be tremendous, it must be considered reasonable to delete such a sequence entirely as soon as possible (which is as soon as respective knowledge on the existence of the sequence is available). Otherwise, measures must be taken to secure the data adequately (which would be challenging).

From a legal point of view, it must be differentiated between data acquisition outside the car (surrounding traffic) and data acquisition inside the car. This should apply to the technical requirements as well.

Generally speaking, it is advisable, according to the basic principles described above, to do without any video surveillance (in case this proves possible). And pure surveillance (without any recording) is always the less incriminatory measure. Therefore data acquisition by means of video recording should only be carried out, if indispensible. However, this will usually be the case with FOTs so the following statements will concentrate on necessary video recordings [ROSSNAGEL, 2003], BfD-INFO 1, 2002.

**2.5.5.1 Video recording of third parties**

Video surveillance by means of optical-electronic devices (video surveillance) is only permissible according to the guidelines provided in Sec. 6b BDSG and is also considered critical within the Directive 95/46/EG (cp. Art. 33 Directive 95/46/EG that contains a revision clause to enhance data privacy in case of video and image surveillance). As far as Sec. 6b BDSG is concerned, it has been criticised that a differentiation of private (video-) data acquisition and video surveillance by public bodies is not made. The scope of sec. 6b BDSG therefore comprises public as well as private bodies and according to its wording it is only applicable to the “surveillance” of publicly accessible places (which would apply to roads). This, however, does not lead to the conclusion that other recordings are irrelevant in terms of data privacy (this is only the case with really private recordings such as those taken within a family). Any (other) video recordings must therefore meet the provisions stipulated in sec. 6b BDSG, in order to achieve compliance in case of video-data acquisition by non-public institutions. Data acquisition must therefore comply with the following requirements:

- Data acquisition must be made openly. A hidden camera will therefore not be regarded as permissible as long as consent of the participants concerned has not been obtained.
- A legitimate interest for video-data acquisition must exist (cp. sec. 6 para. 1, No. 3 BDSG). In case of a FOT the concrete legitimate interest will be the same for which video data must be recorded in the first place (and can not be done without). In case of research (a value of constitutional weight too, cp. above and Art. 5 para. 3 Grundgesetz = German constitution) the concrete legitimate interest is implicated by the motivation (research).
- The video data must be necessary in order to achieve the purpose identified as the legitimate interest. Here it must be considered that the storage of data must also be indispensible, as any storage of video data is considered ultima ratio (i.e. there are no other possibilities that will fulfil the same purpose). This should be overcome in case of a FOT, as long as there is sufficient need of video data.
- The video data must be deleted as soon as it is no longer necessary in order to achieve the legitimate purpose of research, cp. sec. 6b para. 5 BDSG. The same will apply in case of a protection-worthy interest of a third party which is in conflict with further data storage. [ROSSNAGEL, 2003], [BfD-INFO 1, 2002]
Video recordings might further be restricted on private premises or even military locations. Here special consent will be needed from the authorised person in order to perform video recording, possibly the vehicle’s access will be interdicted.

### 2.5.5.2 Video recording of the driver

The situation for the driver differs strongly. Basically, however, the same requirements and regulations are valid in this case. The main difference is that the driver will always have to give his/her consent to the video recording as the permanent recording within the car is strongly invasive. By no means may the recording be taken out with a hidden camera and without informing the driver beforehand [cp. ROSSNAGEL, 2003].

Further care must be taken not to record any video data of other passengers, if this can be avoided by technical means (as usually a legitimate interest in so far will not exist, and, as mentioned above, the principle of data economy must be applied). In case the video recording of other passengers is inevitable, it must be ensured that the camera is well on view and thus obvious that data is being recorded. The designated test participants must in this case further be sensitised to inform any passenger of the recording. The same will, of course, apply to any further drivers of the car. It may, however, for a number of reasons be a good idea to restrict the use of the participating vehicles to the actual test participant or provide for a “switch off” of all systems and data logging (for safety and data privacy reasons) in case other drivers use the vehicle. This will not only provide for consistent data (which will be necessary from a scientific point of view) but at once ensure that all the contractual agreements actually reach the driver.

### 2.5.6 Implications of criminal law

If the FOT goes according to plan, criminal law will not be affected. However, in case of accidents, the data collected might be used otherwise. In this case, personal data of the test participant will have been recorded to an extent that is generally not available in this situation in the first place. As the breach of certain traffic rules may be relevant under criminal law aspects, the data will be of interest for means of criminal prosecution as well. This, at least in case the availability of the data is known; however, due to readily identifiable modifications within the vehicles (perhaps even a camera is on view for video-recordings) the availability of data might be obvious. It must therefore be expected that the data might even be subpoenaed on application of a public prosecutor by a judge. For Germany this possibility is given, cp. sec. 94 seqq. StPO (Strafprozessordnung = Code of criminal procedure). In this context it must be pointed out that these legal effects will be tolerated in Germany and the recording for research-reasons will not privilege the test-participant (i.e. it would not be barred to confiscate the data for the reason of criminal prosecution). And data privacy provisions (for Germany) will not bar the use of this data either.

In case the data is already in hold of the organisation doing the research, it would have to be released anyhow (cp. sec. 95 StPO) – in spite of the fact that this might mean a moral dilemma for the researcher involved in the FOT. These effects, however, may be largely avoided if the procedures suggested for the means of ‘data privacy in case of research activities’ (cp. chapter 2.5.4) are taken into effect.

In this context, it must be pointed out that a suspected person always has the right to remain silent in order to avoid self-incrimination (i.e. the accused is not obliged to cooperate actively in their own conviction: “nemo tenetur se ipsum accusare”). It will therefore not be considered a criminal offense in itself, in case the accused would delete or destroy the data recorded. As far as a civil
court, however, will decide on compensation for loss suffered, conclusions can be drawn from the fact that the data has been deleted/destroyed.

2.6 Insurance

2.6.1 Introduction

This chapter exemplarily goes into the legal situation for Germany as far as road traffic liability and the associated insurance issues are concerned. This should allow for sufficient insight in this aspect to sensitise the reader to possible arrangements and precautions to be taken as far as the insurance of the test-vehicles is concerned.

2.6.2 Road traffic liabilities in Germany

According to national road traffic liability law in Germany, accident victims can potentially claim for compensation from the “keeper” of a vehicle (“Fahrzeughalter”, cp. below), the driver and the vehicle’s insurance.

The “keeper” of the vehicle will usually at once be the legal owner; however, this is not invariably true. From a legal point of view, the “keeper” is generally defined as the person that makes use of the vehicle at his/ her own expense, i.e. provides for the costs and has the capitalised use [HENTSCHHEL, 2007]. The “keeper” will be liable for any damage to the legally protected interest resulting from the operational hazard. The only (basic) requirements for a claim in so far are that the vehicle was in use at the time the damage occurred (this, however, can even be assumed when parking in public space) and that the vehicle’s use (i.e. its operational hazard) has led to damage of the legally protected interest. In case a further vehicle plays a part in the emergence of the damage to the legally protected interest, it’s respective contribution will be considered too. The same applies to contributory negligence of the damaged person. In so far this applies to the causation giving rise to the damage of the legally protected interest. In a further step the remoteness of further damages incurred that can be traced back to the damaging event are considered too.

Unlike the “keeper”, the driver will only be liable in case of fault (e.g. any driving mistake, etc. that leads to a damage of the protected interest). Apart from this, the driver is, generally speaking, liable for the same damages to legally protected interests as the “keeper”. If the driver’s and “keeper’s” liability is given, they will both be jointly and separately liable (together with the insurance, cp. below) for the damage (a term that describes that the damaged person can decide freely which debtor to claim against for the whole damage – which is then settled between the two or more debtors).

Of course, the damage the “keeper” as well as the driver are liable for, is insured via the same compulsory car insurance. By provisions of law the “keeper” is obliged to contract such an insurance in case he wishes to operate his vehicle on public roads. It is regulated that the contract covers the damage on account of the driver as well as the compensation for damages imposed on the “keeper” (and as long as the contractual obligations are adhered to, no recourse will be taken). In Germany, a direct claim of the aggrieved party against the insurance is admissible according to provisions of law [ALBRECHT, 2005].
2.6.3 Insurance for road traffic in Germany

In so far as material damages are concerned, it is – according to the situation in Germany – important to distinguish between many different types of insurance. First of all, the compulsory road traffic insurance will cover the damage to the property or health of a third party (automobile third party insurance – as stated above, this insurance is compulsory in Germany and therefore widespread and generally referred to as the “car insurance”). It will, however, neither cover the physical damage to the “own” vehicle nor the damage to the health of the driver and other occupants. As far as the physical damage to the car is concerned, a special insurance can be obtained to cover this (comprehensive insurance/ comprehensive coverage insurance including collision). As far as the health of occupants or other passengers is concerned, a special motor passenger personal accident insurance type exists that will cover damages to passengers. However, it must be kept in mind that the insurance sum for this insurance is usually restricted (and will generally not be sufficient to adequately compensate for serious injuries, special medical care requirements, etc.). Furthermore, the driver might be excluded in this insurance – here a special insurance may prove necessary (driver personal accident insurance). This, however, is again usually limited to certain insurance sums that may not prove to be sufficient for full coverage. Therefore it may appear to be reasonable in some cases – according to the field test design chosen – to obtain some kind of special insurance tailored to the special needs of the specific field trial (e.g. clinical trials insurance).

Most important in all cases will be to disclose the fact to the insurance provider that the vehicle is participating in a FOT (which in general should simply be accepted by the insurance provider). Insurance rates might rise, however, depending on the systems integrated in the vehicle (subject to the FOT, likely in case of premature systems which might involve additional risks). Disclosing this information and possibly incorporating a respective clause in the contract will be a reasonable method to avoid legal uncertainties as far as insurance coverage in case of an accident is concerned.

2.6.3.1 Automobile Third Party Insurance

As stated above, this insurance is compulsory by law. The minimum insurance sum for this insurance type is in Germany fixed for motor vehicles at 2.5 Million Euro in case of damages to health (in case of fatal injuries or more than three persons injured: 7.5 Million Euro) and in case of damage to property even limited to 500 000 Euro (cp. annexe 1 to Sec. 4 of the obligatory insurance law = “Pflichtversicherungsgesetz”). These, however, do not necessarily cover the whole damage in case of serious accidents and even the maximum compensation sums according to the German road traffic act (which is below the minimum insurance sum) can be exceeded in case the claim is based on the law of torts (in this case a maximum compensation sum no longer exists as far as liability of the “keeper” and the driver are concerned).

It is therefore reasonable to raise the test participant’s awareness to these (general) limitations (cp. chapter 2.3.3.) and, if considered necessary, the test vehicle should be insured to better conditions.

2.6.3.2 Comprehensive insurance/ comprehensive coverage insurance including collision
2.6.3.3 Motor passenger personal accident insurance

In case of damage to passengers, compensation can be obtained within the automobile third party insurance of the injuring party. In case of hit and run accidents, absence of insurance coverage of the third party, etc. compensation can be claimed from the personal accident insurance. It will cover all those damages to health involved from the time the passenger gets in the car until he gets out again [HIMMELREICH/HALM, 2006].

This personal motor passenger accident insurance will generally cover costs for medical treatment as well as the costs involved in the event of motor passengers’ death.

This insurance shall not be enlarged on within this report. However, selected aspects shall be pointed out: this insurance will not necessarily cover the damage to the driver (which may, however, be the case). And insurance sums vary strongly. They may not be sufficient to cover severe health injuries or the costs involved in case of disability. Special attention must therefore be paid towards the maximum sums. Further information on this type of insurance should be gathered in the planning of the FOT (if applicable and considered necessary within the test design chosen) [HIMMELREICH/HALM, 2006].

2.6.3.4 Driver Supplementary Insurance

The Driver Supplementary insurance (= “Fahrerzusatzversicherung”) is a fairly new insurance type and is largely unknown. The conditions of insurance may differ strongly. Motor passengers are in Germany (since 1st Aug. 2002) covered by the Automobile Third Party Insurance. This is even the case, if it comes to a self-inflicted accident caused solely by the driver of the vehicle they are occupying. In this case, the passengers can claim for compensation against the vehicle’s Third Party Insurance. Therefore today only very particular cases depicted above will leave passengers without insurance coverage.

The driver, however, is the only car occupant who may not be able to claim for damages (or only have a partial claim against the third party’s insurance). This Driver Supplementary Insurance will cover these damages as far as compensation cannot be obtained otherwise. This insurance type is generally considered reasonable. [HIMMELREICH/HALM, 2006]

2.6.3.5 Clinical Trials Insurance

As stated just above in chapter 2.6.3.4, the risk of damage to the health of the driver (who is at once the test participant) is severe and must be considered beforehand. Of course, the testing in open traffic will also involve many further risks to third parties which must nonetheless be considered. Therefore the justifiable risk will be limited strongly in the first place.
Shall a greater risk nonetheless be taken (and this be considered otherwise permissible), a clinical trials insurance may be necessary to cover the risks involved. As far as (medical) clinical trials are concerned, this insurance type is common. For the purpose of road traffic such an insurance would have to be tailored according to the specific needs of field operational testing.

2.6.3.6 Test Equipment Insurance

The data-logging equipment and possibly prototype systems may have to be insured too by means of property insurance. This should be kept in mind when planning a Field Operational Test. This electronic equipment will usually not be covered by the comprehensive insurance/comprehensive coverage insurance including collision (as maximum insurance sums for common electronic equipment in vehicles will presumably be exceeded by far).

2.6.4 Insurance issues in case of non-overrideable systems

A basic principle of European road traffic is driver’s full control. Therefore non-overrideable systems that influence the driving task, comprise unsolved and complex legal questions that cannot be fully assessed at present [cp. “Communication from the Government of the Federal Republic of Germany to the European Commission of 27 June 2007” page 6, stipulating conclusions of the eSafety Conference in Berlin on 5th/6th June 2007].

As far as insurance issues are concerned, it must therefore be taken into consideration that any type of insurance known today assumes full driver’s control. In case the Field Operational Test is otherwise regarded permissible (cp. chapters 2.7 and 2.8), special arrangements for specific insurance coverage must be taken into consideration.

2.6.5 Insurance issues in case of cooperative systems

Cooperative systems may comprise very specific insurance issues in case the influence on the driving task is strong: If the cooperative aspect therefore involves any kind of vehicle control, it must further be taken into consideration that all present regulations on road traffic are based on the assumption of a vehicles (and driver’s) autonomy. In case control of a vehicle is therefore dependent on other vehicles (the same for road side beacons) it must be assessed whether common liabilities (and thus insurance contracts) will sufficiently cover all possible damages in between the linked (“cooperative”) vehicles and towards surrounding traffic. If this is not longer the case, it might turn out to be a legally challenging task to tailor the insurance contract to fit the actual “cooperative” situation.
2.7 Vehicle licensing requirements

2.7.1 Licensing requirements for motor vehicles in general

As long as the Field Operational Test is focussed on the evaluation of applications already approved of as optional or standard fitting of the test vehicles, no vehicle licensing requirements will be in question.

The licensing of a vehicle for Europe is generally taken out by means of type approval according to technical rules and regulations in international law. For Europe the so called ECE-Regulations are binding (and their fulfilment will be considered sufficient for road admission throughout Europe). However, gaining a type approval certificate for a new vehicle type is challenging and costly and can hardly be considered an appropriate approach for field testing. Apart from this, it must be taken into consideration that in practice an approved vehicle will serve as a basis for further system integration in a FOT.

In this case the approved vehicle is modified for the purpose of field testing. These modifications may – much depending on the character of the modifications – lead to the cancellation of the vehicle’s operating licence. Whether this is the case strongly depends on national licensing requirements. These may still be in existence (as is the StVZO = “Straßenverkehrszulassungsordnung” in Germany). According to the provisions therein, the operating license will expire in case of certain modifications (cp. Sec. 19 para. 2 StVZO).

This does not apply, in the case where the vehicle parts integrated have a general approval of their own (which is further specified) or have already been approved of as they are – fitted to the vehicle (and have thus been included in the operational licence of the respective vehicle). In order to make the legal effects of modifications manageable, the German Federal Ministry of Transport has established a catalogue of possible modifications and their impact on the vehicle’s operating licence (this catalogue is not legally binding) [HENTSCHEL, 2007]. The catalogue will provide a good overview in terms of challenges to be overcome for field testing according to the modifications envisaged. Generally speaking, minor changes will not lead to the cancellation of the vehicle’s operating licence. The modifications must, however, be made transparent.

2.7.2 Special regulation for vehicle manufacturers

In this context an important regulation shall be pointed out that will partly exempt vehicle manufacturers (in hold of the type approval certificate for the respective vehicle) from special licensing requirements (cp. sec. 19 para. 6 StVZO). In Germany, a vehicle that is used for testing by the manufacturer and registered as such, will not be deprived of its operating licence, if further parts are integrated for the purpose of testing [HENTSCHEL, 2007]. This regulation will, however, not permit the modification of vehicles privately owned and registered.

2.7.3 Licensing requirements of “premature” systems/ applications in general

For the purpose of this report a “premature system” shall be considered as a system that has so far not been approved of within vehicle type approval and is not separately approved as a car accessory either. In order to evaluate such a “premature system” in a Field Operational Test, a special approval might be required to maintain the vehicle’s operating licence.

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For Germany the law within the federal state is decisive as far as the responsibility of the local public authority is concerned (cp. Sec. 68 StVZO). The responsible public authority will then decide on the necessity of a report by an officially recognised expert certifying consistency with legal provisions. This will usually not be necessary for manufacturers, cp. above, chapter 2.7.2.

### 2.8 Special licences (exceptional licences within road traffic law)

#### 2.8.1 Introduction

Further exceptional licences should normally not be necessary for a Field Operational Test – apart from those discussed above in case of modifications on the vehicle’s side. This finding will also apply to the drivers’ driving licences: Driving licences correspond to certain vehicle types and their use will therefore cover any driver assistance as well as any driver information system that does not put full driver’s control into question. The fact that such driver assistance systems or even data logging equipment is implemented in a vehicle or not will – if at all – influence the operational licence of the vehicle (see chapter 2.7) and will not call for any further special licence on the side of the driver.

However, further attention must be raised towards those systems that may intervene beyond full driver’s control. In this case, exceptional licences may be necessary after all.

#### 2.8.2 Full control of the human driver

The technology available in the past, as well as the Vienna Convention on Road Traffic (1968) have likewise led to the assumption of the driver’s responsibility to ensure full control over his vehicle. Art. 8 para. 5 and Art. 13 para. 1 of the Vienna Convention explicitly stipulate this full control of the driver over his vehicle “under all circumstances” (Art. 13 para. 1 Vienna Convention on Road Traffic).

The Vienna Convention on Road Traffic Formulates a minimum set of requirements in purpose of free (and safe) flow of cross-border transport between the signatory states. The document has had strong influence on the development of national Road Traffic codes and the all-underlying idea of full control of a human driver has thus found its way into many legal provisions concerning road traffic in Germany as well as other countries throughout the EU (and worldwide). In fact, the number of legal provisions based on this idea of full driver’s control went without saying and can even be traced back to national road traffic liabilities (which will again influence insurance issues of such systems, cp. above, chapter 2.6.4).

These findings are common for the EU at large and must be taken into consideration, in case a system shall be evaluated in a Field Operational Test that overrules full control of the driver. In this case, special legal advice as to the consequences the specific system might bring about will be necessary, as will be the application for exceptional licences. These restrictions will, however, not affect systems that do not put the full control of the driver into question. As such must be considered systems that optimise driver initiated functions (e.g. ABS), advisory systems (e.g. speed alert) and fully overrideable ADAS (e.g. adaptive cruise control). Those non-overrideable ADAS must also be considered permissible that have the same effect as traditional technical limits.
in vehicle performance (e.g. speed limiters) or intervene in situations that cannot be handled by the driver in time and ensure that the intervention keeps in line with the drivers’ intentions and will (e.g. ESC/ESP and automatic emergency braking) [ALBRECHT, 2005].

Interventions into driving, however, that counteract the intentions and will of a driver still able to perform the driving task would bring about legal consequences that cannot be predicted at present. [cp. “Communication from the Government of the Federal Republic of Germany to the European Commission of 27 June 2007” page 6, stipulating conclusions of the eSafety Conference in Berlin on 5th/6th June 2007]

Therefore a need for an exceptional license will arise whenever a non-overrideable system that does not ensure full control of the driver shall be subject to a Field Operational Test.

### 2.9 Ethical rules

Ethics can be considered as a sub-discipline of philosophy and moral principles guiding behaviour, i.e. they help to distinguish, if a certain conduct is right or wrong. Ethical rules apply and must be obeyed in all kinds of research activities on living organisms and, of course, in particular with human beings. The currently most important ethical rules relevant for research but also professional work on human beings have recently been reviewed as a subject of the NoE HUMANIST TF 2 activity on ethical laws and guidelines that apply to behavioural experimental studies [HANZLIKova, 2004]. However, in the context of the present report and the planning and preparation of FOTs it does not seem to be necessary to review and discuss all principles which apply when e.g. performing medical or genetic research. Here it seems to be sufficient to refer to the key principles for the evaluation of research which are according to [HANZLIKova, 2004, p.5]:

- **Respect for the person[ality]** and his or her autonomy, dignity and self-determination
- **Beneficience**: a commitment to maximise potential benefit and minimise possible risks

Regarding the planning and performance of FOTs as research projects in the 7th Framework Programme the European Commission makes a clear point when stating: “All research activities carried out under the seventh Framework Programme must be carried out in compliance with fundamental ethical principles” (Decision no. 1982/2006/EC; see [http://ec.europa.eu/research/science-society](http://ec.europa.eu/research/science-society)). For this reason research proposals shall be evaluated by an independent panel of experts if ethical aspects have been properly addressed. For practical purposes of writing a proposal the EC provides a checklist with critical questions which is designed to help proposers to identify possible relevant ethical issues (see [http://ec.europa.eu/research/science-society](http://ec.europa.eu/research/science-society)). With regard to FOTs the following two questions on “Privacy” seem to be most relevant:

- **Does the proposal involve processing of genetic or personal data?**
- **Does the proposal involve tracking the location or observation of people?**

In case of “yes” proposers are required to describe at least the procedures for obtaining informed consent from the persons and the procedures for protecting confidentiality. Moreover, the process of anonymisation or encoding of the data shall be described and it has to be indicated, if the data are used for commercial purposes. These aspects will naturally correspond to legal data privacy provisions, cp. chapter 2.5.
3 Conclusions

Stakeholders requirements have been collected by means of a stakeholders questionnaire administered via web. Respondents to the questionnaire came from different backgrounds, but the majority came from either industry or research institutes. When we look at the focus of interest and the questions to be answered by FOTs we see interests in both research items and business-related issues. However, there is also interest in policies to be supported by FOT results. The respondents see FOTs as a good means to reply to a wide range of questions. The results will provide a strong support in better understanding driver behaviour and in improving systems, services and policies. Both social and commercial interests will benefit from FOTs results. Social issues include safety, traffic, environment, and mobility. Commercial interests include system and service improvement, competitiveness, cost effectiveness, user acceptance and willingness to pay. Business models can be developed on the basis of the results. FOTs may provide convincing results that can be used to promote products and convince customers.

Respondents see FOTs as a good method to gather information to realize their goals because it brings a wealth of information on everyday driving behaviour of normal drivers, on the long-term effects of system use and on the strong and weak points of systems. For research, FOTs will bring deeper insights in driver behaviour and allow the development of new research methods.

Planning FOTs is an important and rather complex process and is the focus of Deliverable 2.5 (FOT Implementation Plan). There are a lot of factors to take into account. Of course every FOT is different, depending on the system to be tested and the questions to be answered. This makes it hard to give general guidelines which are applicable for all FOTs. However, it is of the utmost importance to take into account issues on privacy, liability and user acceptance from the very start. The collection and analysis of large sets of data is a point of concern. The systems to be tested need to work correctly, and need to have a relatively high level of maturity.

Automatic data collection is highly advantageous for FOTs, but driver observation and questionnaires can sometimes be used as well, especially for systems that provoke behaviour that is observable and/or understandable by users themselves. FOTs are best being done on the real road and with ordinary drivers; the respondents do not want to focus on on specific demographic groups or special geographic locations. FOTs are excellent for studying long-term impact on driver behaviour. However, for testing specific systems not all these general recommendations are useful.

There is optimism about the willingness of drivers to participate and install systems in their cars. Participants need to be rewarded, preferably with a sum of 100-200 Euros.

50% funding is required of the European Commission for projects performing FOTs, including material costs. The results need to be disseminated broadly, both to stakeholders and to the general public.

From an overall perspective on legal and ethical issues for FOTs, a number of aspects must be taken into account in terms of planning and accomplishing of such testing. This is mainly due to the significant difference between normal driving and FOTs which lies in the evaluation of possibly immature systems (as far as legally permissible), the great extent of data logged and the unique and possibly unprecedented situation test drivers will be confronted with in open traffic.
To sum up, there are no prohibitive difficulties either from a legal or from an ethical point of view presently foreseeable. As long as the advice provided in this report is considered, potential risks – as far as presently foreseeable – can either be settled, avoided or safely handled. It must, however, further be taken into account that the advice provided here is without knowledge of the concrete system design and thus specific dangers that might arise in case of particular systems which cannot be covered. It can be expected that such concrete difficulties – apart from those indicated as delicate in the report – can be overcome. This, however, will call for further support on legal and ethical issues within the actual FOT.

5 References

[ALBRECHT, 2005]:

[BfD-INFO 1, 2002]:
[HANZLIKOVÁ, 2004]:

[HENTSCHEL, 2007]:

[HIMMELREICH/HALM, 2006]:

[REGAN, 2006, VOL 1]:

[REGAN, 2006, VOL 2]:

[ROSSNAGEL, 2003]:
Appendix I.

FESTA Stakeholders’ requirements for Field Operational Tests
Questionnaire

Welcome to the FESTA Support Action Questionnaire to collect stakeholders’ needs and indications on Field Operational Tests.

The FESTA Field Operational Tests (FOT) Support Action is funded by the European Commission Information Society and Media among the initiatives of the 7th Framework Programme. FESTA aims to develop a robust FOT methodology and guidelines, for this reason the collection of the opinion of all stakeholders that are or will be involved in Field Operational Tests is vital.

Please consider that there are not right or wrong answers, this questionnaire is a great opportunity to pick up your opinion and to take it into account in the forthcoming FESTA activities to provide guidelines to plan and perform future Field Operational Tests at European level.

Please select your Stakeholder Group

Please tick the most suitable item (only one):

INDUSTRY
- OEM
- Technology supplier (hardware, software, …)
- Nomadic device producer

SERVICE PROVIDERS and OPERATORS
- Road operator
- Fleet operator
- Service provider
- Data provider
- Telecommunication operator
- Insurance

PUBLIC AUTHORITIES
- European Commission
- Transport ministries
- National authority
- Technology support agency

RESEARCH INSTITUTES and USERS
- Research institute
- University
Please indicate your major focuses of interest

Please tick one or more options:

- Supporting European policies on Transport and Information Communication Technologies
- Supporting policies at national level (road safety, CO₂ reduction, …)
- Supporting the competitiveness of the industry
- Promoting a more efficient use of the infrastructure
- Technology development
- Service provision development
- Market analysis and acceptance of new systems
- Information on potential future trends
- Boosting ITS uptake (verifying and identifying functions with positive impacts)
- Post-graduate studies
- Others (please specify) ………..

**PLEASE FILL IN ONLY THE PART RELATED TO YOUR STAKEHOLDER GROUP**

**INDUSTRY**
Evaluate the level of interest from industries’ point of view

- In your opinion, which are the possible specific benefits of FOTs for OEMs?
  (Select one or more options)
  - None
  - Improving system performances
  - Improving customers acceptance of the product
  - Increasing customers’ willingness to pay
  - Others (please specify) ………..

- In your opinion, which are the possible specific benefits of FOTs for automotive suppliers?
  (Select one or more options)
  - None
  - Improving system performances
  - Improving customers acceptance of the product
  - Increasing customers’ willingness to pay
  - Others (please specify) ………..

- In your opinion, which are the possible specific benefits of FOTs for basic technology suppliers?
  (Select one or more options)
In your opinion, which are the possible specific benefits of FOTs for nomadic device suppliers?

(Select one or more options)

- None
- Improving system performances
- Improving customers acceptance of the product
- Increasing customers’ willingness to pay
- Others (please specify) ..............

In your opinion, which are the possible specific benefits of FOTs for road operators?

(Select one or more options)

- None
- Improving the quality of the services
- Improving customers satisfaction
- Improving traffic flow
- Reduce road accidents
- Others (please specify) ..............

In your opinion, which are the possible specific benefits of FOTs for fleet operators?

(Select one or more options)

- Improving the quality of the service
- Improving customers satisfaction
- Enhancing logistic operations
- Others (please specify) ..............

In your opinion, which are the possible specific benefits of FOTs for service providers?

(Select one or more options)

- Improving the quality of the service
- Improving customers satisfaction
- Improving service level
- Others (please specify) ..............
In your opinion, which are the possible specific benefits of FOTs for data providers? (Select one or more options)

- Improving the quality of data provision
- Improving customers satisfaction
- Others (please specify) ……………

In your opinion, which are the possible benefits of FOTs for telecommunication operators? (Select one or more options)

- Improving the quality of the service
- Improving customers satisfaction
- Increasing customers’ willingness to pay
- Others (please specify) ……………

In your opinion, which are the possible benefits of FOTs for insurances? (Select one or more options)

- Indications on risk reductions related to each system or service
- Others (please specify) ……………

In your opinion, can FOTs be used to improve the quality and performance of the services?

- YES
- NO

If your answer to the previous question is YES, can you please specify?

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

PUBLIC AUTHORITIES
Evaluate the level of interest from public authorities’ point of view

To which types of FOTs are you more interested in? (Select one or more options)

- Questionnaires to buyers of equipped vehicles
- In vehicle data acquisition performed on equipped vehicles that are bought by customers
- On road data acquisition performed on roads equipped with infrastructures
- Test with users on prototypes or equipped vehicles on public road

To which types of impact assessment are you more interested in? (Select one or more options)
Please estimate the level of importance of the following impacts in the evaluation of FOTs.

(1 = less important, ……, 5 = most important):

Safety

-  ○
-  ○
-  ○
-  ○
-  ○

1  2  3  4  5

Mobility - Efficiency

-  ○
-  ○
-  ○
-  ○
-  ○

1  2  3  4  5

Environmental, CO₂ reduction

-  ○
-  ○
-  ○
-  ○
-  ○

1  2  3  4  5

Driving comfort

-  ○
-  ○
-  ○
-  ○
-  ○

1  2  3  4  5

Competitiveness

-  ○
-  ○
-  ○
-  ○
-  ○

1  2  3  4  5

Others (please specify) ………

-  ○
-  ○
-  ○
-  ○
-  ○

1  2  3  4  5

In your opinion, should an FOT consider always all the previous possible impacts?

-  YES
-  NO

If your answer to the previous question is “NO”, is it enough that a new system or service should guarantee to avoid negative impacts as secondary effects? (for example: a safety system should not increase the level of congestion)

-  YES
-  NO
• What do you expect from the outcome of an FOT impact assessment in order to use it as a decision making tool, for example to decide to use the available budget for incentives?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

RESEARCH INSTITUTES and USERS
Evaluate the level of interest from research institutes’ and users’ point of view

• In your opinion, which types of user involvement could be possible in FOTs? (select one or more options)
  □ Questionnaires to buyers of equipped vehicles
  □ In vehicle data acquisition performed on equipped vehicles that are bought by customers
  □ On road data acquisition performed on roads equipped with infrastructures
  □ Test with users on prototypes or equipped vehicles on public road
  □ Focus groups

• In your opinion, would users be prepared to accept to install a data acquisition equipment in his/her car to perform an FOT?
  □ YES
  □ NO

• If the data acquisition equipment is not type-approved could users accept to take the responsibility of its use in their cars?
  □ YES
  □ NO

• Which type/level of compensation has to be considered for the users involved in FOTs? (Select one or more options)
  □ Nothing
  □ Monetary compensation
  □ Gift
  □ Other forms of compensation (please specify) …………
For example: a user that is involved in one-year FOT that implies to answer to four questionnaires and to install (and un-install) a data acquisition device in his/her new car has to be compensated with:

- Monetary compensation
- Gift
- Nothing
- Other forms of compensation (please specify) 

If the answer to the previous question is: Monetary compensation or Gift, please specify the correspondent value of the required compensation:

- 200 Euro
- 100 Euro
- 50 Euro
- Others (please specify) 

Which duration should have an FOT to understand the impact on driver behavior? (select only one option and please indicate also the number)

- Traveled hours 
- Traveled Km 
- Other (please specify) 

Is user acceptability an issue to be always considered when planning an FOT?

- YES
- NO

Is willingness to pay an issue to be always considered when planning an FOT?

- YES
- NO
PLEASE ALL STAKEHOLDER GROUPS SHOULD FILL IN THIS PART

- In your opinion, which are the main ethical constrains to be considered when planning FOTs?
  ______________________________________________________
  ______________________________________________________
  ______________________________________________________

- In your opinion, which are the main privacy constrains to be considered when planning FOTs?
  ______________________________________________________
  ______________________________________________________
  ______________________________________________________

- In your opinion, which are the main legal constrains to be considered when planning FOTs?
  ______________________________________________________
  ______________________________________________________
  ______________________________________________________

- In your opinion, which are the main technical constrains to be considered when planning FOTs?
  ______________________________________________________
  ______________________________________________________
  ______________________________________________________

- In your opinion, which level of co-funding from the European Commission could be required for the different types of activities that will be performed in FOTs? (Select one option)

  For questionnaires to buyers of equipped vehicle
  - 50%
  - 50% plus 100% of incentives for buyers
  - 100%
  - Other (please specify) ……

  For in vehicle data acquisition performed on equipped vehicles that are bought by customers (Select one option)
  - 50%
- 50% plus 100% of data acquisition equipment
- 100%
- Other (please specify) ......

For test with a sample of users on prototypes or equipped vehicles on public road (Select one option)
- 50%
- 50% plus 100% of prototypes costs
- 100%
- Other (please specify) ......

For test with a sample of users on prototypes or equipped vehicles on private track tests
- 50%
- 50% plus specific equipments for performing the FOTs
- 100%
- Other (please specify) ......
In vehicle, cooperative, nomadic device based systems and services to be used in FOTs

- In your opinion, which types of systems or functions could be considered for FOTs?

Select all appropriate systems and services.
Per each system or service that you select please select also:

1. the most appropriate FOT method to be used among: questionnaires (option A) or data acquisition (option B) or driver monitoring (option C)
2. the most appropriate FOT location among: public road (option W) or private test track (option X)
3. the appropriateness or not to perform FOTs in specific geographic areas (tick the GEO option if appropriate)
4. the appropriateness or not to perform FOTs on specific demographical groups (tick the DEM option if appropriate)
5. the appropriateness or not to evaluate “drivers’ behaviour long terms impact” (tick the BEH option if appropriate)

- Adaptive Cruise Control (ACC)
- Adaptive Brake Lights
- Anti-lock Braking System (ABS)
- Adaptive Head Lights
- Alcohol (inter)lock
- Antitheft system
- Attention control system
- Automatic Headlight Activation
- Blind spot monitoring
- Brake assistance, emergency brake
- Collision warning and avoidance
- Curve speed warning
- Dangerous intersections, school zones, sharp bends
- Driver impairment warning
- Driver support in merging traffic
- Dynamic control systems
- Dynamic traffic management
- Dynamic Vehicle Safety Management Systems (DVSMS)
- Eco driving
- eCall
- eToll
- ESP/ESC
- Event data recorder
- Extended environmental information
- Fuel efficiency advisor
- High quality traffic information
- Infrastructure Based Warning Systems/Local Danger Warning
- Inter-vehicle Hazard Warning
Lane departure warning system
Local danger warning
Lane Keeping Assistant
Navigation
Night vision
Personalised navigation services with different options (incl. enhanced map data)
(Nomadic) device integration to vehicle systems: e.g. infotainment etc.
Obstacle & Collision Warning
Pay-as-you-drive
Perceiving vehicle surroundings
Roll Stability Control system (RSC)
Real-time traffic & travel information
Tire Pressure Monitoring System
Speed alert/limiter
Traffic signs recognition
Vision enhancement
Others (please specify) ............
Others (please specify) ............
Others (please specify) ............

- Why do these systems or services need FOTs to evaluate their benefits on safety, mobility, driving comfort, environment and competitiveness?

- In your opinion, at what stage of technical maturity should the selected systems or services be tested?
  - When commercially available
  - When pre-industrialised prototypes are available
  - When technological prototypes are advanced
  - Other (please specify) ............

- In your opinion, which are the crucial questions you want an FOT to answer on the selected systems and services?
In your opinion, which are the best means to disseminate FOTs results to related stakeholders to make them most useful?

- Public technical reports available on the web
- Papers in conferences
- Others (please specify) ………..

Business models in FOTs

In your opinion are FOTs results relevant to develop business cases and cost benefit analysis to support the industrial development of new systems, services and functions?

- YES
- NO

If yes, please specify how FOTs can support these activities

In your opinion are FOTs results relevant to plan strategies for promotion of new systems, services and functions deployment on the market?

- YES
- NO

If yes, please specify how FOTs can support these activities
THANK YOU VERY MUCH FOR YOUR KIND COOPERATION

Optional fields:

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