Test communities description

Large Scale Collaborative Project
7th Framework Programme
INFSO-ICT 224067

Test communities description

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Project co-funded by the European Commission DG-Information Society and Media in the 7th Framework Programme
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<tr>
<td>FOT</td>
<td>Field Operational Test</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technology</td>
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<td>TeleFOT</td>
<td>Field Operational Tests of Aftermarket and Nomadic Devices in Vehicles</td>
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# REVISION CHART AND HISTORY LOG

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The present public deliverable is an IP level deliverable, which describes the TeleFOT test communities. TeleFOT is a European co-funded large scale collaborative project that is creating a European wide user community for long term testing and assessing mobile driver support functions and services while driving. Field Operational Tests (FOTs) focus on the impact of technically mature ICT systems, investigating safety, user acceptance efficiency and deployment aspects. The TeleFOT test communities are spanning in the Northern (Sweden and Finland), the Central (U.K., France and Germany) and Southern (Spain, Italy and Greece) Europe.

**Figure 1: TeleFOT Test Communities**

The main objective of TeleFOT SP3 is to design, develop and validate tests communities for Field Operational Tests including both large scale and detailed trials and covering the
North, the Central and the South Europe, for the assessment of the introduction of nomadic devices to the vehicle environment. In that course, the current deliverable was prepared in collaboration between SP3 and the project management and describes the TeleFOT test communities, as these are being developed and set within TeleFOT SP3. The present document is the TeleFOT Deliverable 1.4, entitled “Test communities description”, presents the teleFOT Test communities at an upper level of description, in terms of:

1. Map of the area of the tests: the location that each test is planned to be performed is provided for all TeleFOT test communities;
2. Functions tested: all functions are recalled and a mapping of functions tested and tests site is provided;
3. Devices to be used: all nomadic devices to be used during the tests are recalled and a mapping of devices used and tests site is provided;
4. Participants: the number and characteristics of the participants envisioned per test site and test are presented;
5. Road type: the type of roads that will be addressed during the tests for each test site and test is presented
6. Traffic conditions and interaction with other road users: the description of each test community and test site is concluded with the envisioned interaction of the driver with the other road users, taking into account the traffic conditions of the test area

The objective of this public document is to provide a description of each test community and therefore it does not provide any technical details regarding the exact set up and planned testing procedure of each test community and test site, as these are addressed in other deliverables of TeleFOT (Deliverables 3.3.1, 3.3.2 or 3.4.1 respectively). The overall data flows and system architecture for all Large-scale and Detailed FOTs, is provided in TeleFOT Deliverables 3.2.1 and 3.2.2, which are public deliverables, available for download through the TeleFOT website: www.TeleFOT-eu.org.
1. INTRODUCTION

1.1. Relevance to overall TeleFOT objectives

TeleFOT is a Large Scale Collaborative Project under the Seventh Framework Programme, co-funded by the European Commission DG Information Society and Media within the strategic objective “ICT for Cooperative Systems”.

Officially started on June 1st 2008, TeleFOT aims to test the impacts of driver support functions on the driving task with large fleets of test drivers in real-life driving conditions.

In particular, TeleFOT assesses via Field operational Tests the impacts of functions provided by aftermarket and nomadic devices, including future interactive traffic services that will become part of driving environment systems within the next five years.

Field Operational Tests developed in TeleFOT aim at a comprehensive assessment of the efficiency, quality, robustness and user friendliness of in-vehicle systems, such as ICT, for smarter, safer and cleaner driving.

In order to achieve the objective set, TeleFOT established a European wide user community for long-term testing through Field Operation Tests, in order to assess mobile driver support functions and services while driving. Building on previous local initiatives and European projects (such as the AIDE IP and the FESTA research projects), TeleFOT constitutes the first test bed in Europe for in-vehicle use of nomadic devices, in terms of geographical location that the tests are performed and number of testers involved. The final objective of an FOT is to evaluate these in-vehicle functions and services in order to address specific research questions. These research questions can be related to safety, environment, mobility, traffic efficiency, usage, and acceptance. On the other hand, the European dimension is necessary, since the functions and services provided vary by region and country. Furthermore, large cultural differences are expected in terms of impacts and viable business models. When impacts of any given function are assessed the focus is then on whole systems comprising of a service chain of infrastructure operators, service providers, service operators and maintenance of traffic databanks. Also these systems and service chains vary by country, and they carry significance in terms of the quality, timing, relevance and frequency of information brought to drivers.

The present public deliverable is an IP level deliverable of TeleFOT and emanates from the work performed in TeleFOT subproject 3 entitled “Field Operational Tests” and more specifically from work-package 3.3 entitled “Test sites set up”, in coordination with the rest of the TeleFOT sub-projects, the European Commission (especially concerning the definition of functions) and the management of the project. The main objective of the TeleFOT SP3 is to design, develop and validate tests communities for Field Operational Tests including both large scale and detailed trials and covering the North, the Central and the South Europe, for the assessment of the introduction of nomadic devices to the vehicle environment. WP3.3 carries out the technical and organisational arrangements both at conceptual and material levels, enabling the start of the execution of the different FOTs at the project’s different test. The test sites focus either on large-scale tests with numerous vehicles or detailed tests with a few vehicles but with more data, capable of measuring behaviour ‘in detail’. In some countries both approaches are taken.
1.2. Objectives and contents of deliverable

This deliverable provides a view of the TeleFOT test communities where the conduction of the TeleFOT Field Operation Tests will take place. The approaches to be used to reach the TeleFOT objectives through road tests are the (i) Large-scale Field Operation Tests and the (ii) Detailed Field Operational Tests.

1. **Large-scale FOT**: Drivers using their own vehicles in their daily travel. These vehicles are equipped with testing (aftermarket/nomadic) and recording devices measuring speed, position and some vehicle dynamics. These constitute the core of testing. In the current deliverable the large-scale FOTs that are envisioned per test community are presented, while the exact proportion and number of subjects using different devices are to be detailed in the test and evaluation strategy and reported in respective TeleFOT deliverables.

2. **Detailed FOT**: This type of testing complements large-scale FOTs in that they are more detailed in terms of behavioural parameters measured. During the detailed FOTs it is intended that subjects will be using dedicated test vehicles or so-called instrumented vehicles. Detailed FOTs will also generate plenty of data through detailed and repeated testing sessions over the FOT duration. The consortium found it necessary to carry out detailed tests across Europe, since cultural differences explaining driver behaviour and reactions have been indicated to be significant by earlier European behavioural studies and accident statistics. Detailed testing provides a better possibility to give causal explanations to differences between European drivers than large-scale tests. Large-scale tests measure and record differences but do not explain them. In the current deliverable the detailed FOTs that are envisioned per test community are described, while the actual planning of the detailed tests will be provided in the test and evaluation strategy and reported in respective TeleFOT deliverables.

In the next chapter all TeleFOT test communities are presented. This includes the presentation of all the areas across Europe that the FOTs will be performed, the functions to be tested, and the nomadic devices to be used, but also the expected number of participants and characteristics, the type of road and the traffic conditions addressed per test site. In addition, the instrumented vehicles envisioned to be used during the detailed FOTs are also presented. The specific structure was chosen in order to give the reader a view of the set up details per test site and per test community and therefore in TeleFOT overall.

Finally, this deliverable is a public document presenting an overview of the vehicle concepts. It is the basis for subsequent work in the same work-package, which will be detailed in deliverable D.3.2.2. “Test tools”, with specific and detailed description of the tools, in particular systems characteristics: system input-output, mountability and further technical details.
2. TEST SITES DESCRIPTIONS

This section presents the test communities of TeleFOT, through the presentation of the test sites that are part of each test community. In each TeleFOT test site a list of FOTs (either large-scale or detailed) is envisioned. For that reason, the FOTs that are planned for each test site are presented. First the Northern test community is presented, in which two test sites are build, namely the Swedish test site and the Finnish test site. In the Swedish test site a list of large-scale FOTs will be conducted, while the Finish test site will facilitate the execution of both large scale and detailed FOTs. Secondly, the Central test community is presented, in which three test sites are build, namely the British test site, the German test site and the French test site. The set up of the British test site will facilitate the execution of both large-scale and detailed FOTs, the German test site detailed FOTs will be conducted, which will provide insight for the concurrent use of functions and services on the nomadic device while advanced driver assistance systems are in use, while in the French test site a large-scale FOT on the nomadic-based eCall functionality test is built. Third, the Southern test community is presented, in which three test sites are build, namely the Italian, the Spanish and the Greek test sites. In all the Southern test sites, both large-scale and detailed FOTs will be conducted. The presentation of the test communities, decomposed in test sites and FOTs presentation is provided in the following sections.
2.1. Northern Test Community

2.1.1. Sweden

**LARGE SCALE FOTs**

- **Map of the area of the tests**

Some of the tests will be performed in the city of Stockholm (FOT1, FOT2), while the rest of the tests will be performed in all of Sweden, and probably some parts of Norway (FOT3, FOT4).

![Map of the area of the tests](image)

**Figure 2:** Stockholm, Sweden, where the Swedish L-FOTs 1 and 2 will be performed.
Figure 3: Map of Sweden (and Norway) where the Swedish L-FOTs 3 and 4 will be performed.

- Functions to be tested

Four Large-scale FOTs will be performed in Sweden. The summary of the functions to be tested during the tests are included in the following table.
Table 1: Functions to be tested and LFOTs planned in Sweden

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<thead>
<tr>
<th>Functions</th>
<th>FOT</th>
<th>LFOT1</th>
<th>LFOT2</th>
<th>LFOT3</th>
<th>LFOT4</th>
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<tr>
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<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed limit information</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Navigation support (dynamic)</td>
<td></td>
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<td></td>
<td>X</td>
</tr>
<tr>
<td>Green Driving Support</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

More specifically, the functions that will be tested in the Large-scale FOTs are: Traffic information, Speed limit information, Speed alert, Navigation support (dynamic), and Green Driving Support. As it can be seen in the table above, and in coordination through the overall test site plans, these functions will be tested in combinations within four Large-scale FOTs, in the area of Stockholm (for LFOT1 and LFOT2) and in all Sweden and probably some parts of Norway (for LFOT3 and LFOT4), as detailed below:

i) **LFOT1** will involve cars from different car fleets of the City of Stockholm; the functions to be tested in this L-FOT are:
   a. Green driving support
   b. Speed alert

   The cars will mainly be used in Stockholm and the surrounding municipalities. The functions to be tested will comprise real-time guidance on driving style and fuel efficiency with pre- and post-trip tutoring and feedback. The system will also provide ISA.

ii) **LFOT2** will involve buses from Stockholm public transport\(^1\). Summarising, the functions to be tested in this L-FOT are:
   a. Navigation support (static)
   b. Green driving support
   c. Speed alert

   The cars will mainly be used in Stockholm and the surrounding municipalities. The functions to be tested will comprise real-time guidance on driving style and fuel efficiency with pre- and post-trip tutoring and feedback. The system will also provide ISA (Intelligent Speed Adaptation).

iii) **LFOT3** will be conducted in all of Sweden, and probably some parts of Norway; the functions to be tested in this L-FOT are:
   a. Traffic info
   b. Speed Alert
   c. Speed Limit information
   d. Navigation support (static)

---

\(^1\) Please note that this test is still under negotiation phase with the City of Stockholm.
The functions to be tested will comprise Speed Alert and Speed information coupled to an existing off board navigation system (WisePilot and Telia Navigator by Apello).

iv) **LFOT4** will be conducted in all of Sweden, and probably some parts of Norway; the functions to be tested in this L-FOT are:

a. Traffic info

b. Speed Alert

c. Speed Limit information

d. Navigation support (dynamic)

e. Green Driving Support

The test will be an extension of LFOT4 with Green Driving support. Therefore, the functions to be tested will comprise Green driving support, Speed Alert and Speed information coupled to an existing off board navigation system (WisePilot and Telia Navigator by Apello).

Of course these are only provisional plans; exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2.

- **Devices to be used**

The vehicle and the nomadic device to be used during the field tests will be the driver’s one.

- **Participants (No, characteristics, etc)**

The actual test plan for the Large-scale FOTs is still under discussion. However, the provisional situation per FOT, as this is discussed within the Test site is provided in this section. The test users will be carefully selected, matching the average characteristics of the participants of the large scale FOT.

For **LFOT1** it is expected that at least 100 vehicles of the City of Stockholm will be equipped (the City of Stockholm have about 1000 vehicles and all will be equipped by the end of 2010). Each vehicle will be driven by several users, so some method for determining which participant drives which car must be developed (probably some simple roadbook).

For **LFOT2** this issue is still to be determined.

For **LFOT3** it is expected that at least 600-800 participants will be recruited among Wisepilot’s and Telia Navigator’s existing customers.

For **LFOT4** the participants will be recruited among the participants in **LFOT3** in order to be able to use **LFOT3** as a Baseline for **LFOT4**. With some of the participants of **LFOT3** falling out, an estimate of the number of participants are 500 people.
• **Road Type**

The plan is to include all road types, i.e. urban, peri-urban and highway environments, in order to assess the functions under different road conditions. The road types used will be determined by the participants.

• **Traffic conditions and interaction with other road users**

As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according the time of day. Therefore, all traffic conditions will be encountered by the participants. The test planning will seek to include the most representative cases.

2.1.2. Finland

**LARGE SCALE FOT**

• **Area**

The functions and services tested in the Finnish Large-scale FOTs cover the whole country (Figure 4). However, the majority of the test users are likely to be recruited from Oulu, Tampere, Jyväskylä and Helsinki regions due to partner organisation locations and for customer support.
Figure 4: Map of Finland where the Finnish L-FOTs will be performed.

- Functions to be tested

Two Large-scale FOTs are prepared. A summary of the functions to be tested during the tests are included in the following table.

<table>
<thead>
<tr>
<th>Functions</th>
<th>FOT</th>
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<th>LFOT2</th>
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<tr>
<td>Traffic information</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Speed limit information</td>
<td></td>
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</tr>
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<tr>
<td>Navigation support (dynamic)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green Driving Support</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

As can be seen from the above table, these functions will be tested in combinations in two Large-scale FOTs, in whole Finland, as detailed below:

i) **LFOT1** will be performed in co-operation with a company operating a large fleet of vehicles. The nomadic device to be used during the trials will be a personal navigation device (PND) compliant with DESTIA Traffic TMC service. The RDS–
TMC (Radio Data System – Traffic message Channel) service broadcasts up-to-date information on incidents, accidents, congestion, major road works etc. Destia Traffic also reports dangerous road surface conditions like black ice or snowstorms. Messages are broadcasted through radio frequencies and they can be opened with TMC equipped navigation devices.

TMC makes it possible to receive local traffic information on the road in a selected language anywhere in Europe. These services include country specific map material and location tables. At the moment Destia is broadcasting the TMC messages in Finland, in Sweden and in Norway and is looking to expand the service to cover other Baltic Sea regions as well.

The functions to be tested in this LFOT are:

a. **Traffic Information:** Destia Traffic provides the following information:

   - Accidents, major road works and other events that effect traffic flow and disturbances of ferries for national roads 1–999.
   - Congestion in the Helsinki Metropolitan Area and Oulu region.
   - Road weather: unexpected changes in weather conditions, such as black ice or snowstorms.

During the first months of 2009 (1–15.4.2009) the amount of messages sent was: 200 000 road weather related messages, 140 000 traffic congestion messages, 1500 accident messages and several hundred road works messages. Road weather and congestion messages are only valid for a short time, so that e.g. an hour long road weather condition can cause 4 messages being sent. The messages are approximately equally distributed over Finland, except for congestion messages, which have a major concentration in the Helsinki Metropolitan Area.
b. **Speed limit and speed alert:** These functions are standard in most of the PNDs, which are Destia Traffic compliant. Implementation depends on the PND manufacturer. Digiroad, a national road database, can also be used as a source for speed limit information.

c. **Static and dynamic navigation function:** These functions are standard in most of the PNDs that are Destia Traffic compliant.

d. **Green driving.** Additionally, fleet owners are interested in various fuel consumption and driving behavior related indicators. During the test there are plans to prepare an Internet feedback system for drivers / the partner company. This service will be provided by Emtele and VTT.

ii) LFOT2 area is also the whole country, but the test users will be recruited from Oulu region due to Oulu city, collaborating in the recruitment and organisation of the FOT.

The nomadic device to be used during the trials will be a Series 60 smart phone compliant with Logica LATIS™ client. LATIS™ is a Location aware traffic information solution for drivers. It is based on Logica's Enterprise Mobility framework. Logica's location aware traffic information solution is meant for organizations aiming to provide location relevant and real time information for drivers on the road. Traffic and road weather information are provided by Destia. To achieve this and to comply with legislation, LATIS™ utilizes a built-in speech synthesizer to read aloud announcements of nearby incidents or other relevant...
info. On-line map service is used to display the user's position and the exact location of the incident. Current speed and speed limit are also displayed for users equipped with GPS. The current speed is read aloud, if it exceeds the speed limit. As the information exchange in LATIS™ works both ways by nature, all users produce also advanced FCD information. Manual "one button" reporting of traffic incidents enables even a limited number of users to effectively provide traffic information. LATIS™ mobile phone application works also on the background, enabling a simultaneous use of navigator software. It also reads aloud the incoming SMS messages.

The LATIS service is being integrated with DRIVECO service provided by a Finnish company EC-Tools. DRIVECO personal is a green driving advisor for smart phones and an automatic driving diary. DRIVECO collects information on fuel consumption from a separate module connected to OBD-II vehicle interface. The module sends data over Bluetooth to a smartphone running DRIVECO software. Journey summaries are further collected from the smartphone to a web service for reporting and feedback. GPS logs can be used for generating a diary. The development of DRIVECO Personal is based on experience with driving guides for freight transport. Potential savings with green driving are around 10% (www.driveco.fi). The device also allows monitoring and reporting of CO₂ emissions.

![Figure 6: DRIVECO OBD-II module and mobile phone application](image)

Most of the participants of this LFOT will be provided both with a DRIVECO module and LATIS application.

As a summary, the functions to be tested during this LFOT will be:

a. **Traffic Information** (information provided by Destia)

b. **Speed limit info and speed alert**

c. **Green driving**.
These are only provisional plans; exact test plans are being defined in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2.

**Nomadic Devices to be used**

Two different types of devices will be tested in Finland:

- **LFOT1**: PNDs (Personal Navigation Devices) with TMC receiver, capable of receiving Destia Traffic TMC messages. Destia has made agreements with the following PND manufacturers (status 05.09): Tomtom, Garmin, Mio and Navigon. Most likely a Garmin PND for professional use, which allows interfacing to an in-vehicle logger will be selected.

- **LFOT2**: Smartphones based on the S60 software platform, with built-in or external GPS receiver. In addition the Driveco module will be used in the vehicle.

The plan is to recruit users who already own a device compatible with the tested functions: Destia Traffic compliant PND or S60 with built-in/external GPS. Additionally, it is likely that VTT will purchase devices.

**Participants (No, characteristics, etc)**

The Finnish Large Scale FOTs aim to include 400–450 users, with in-vehicle logging. The target for LFOT1 and LFOT2 is 200 users for both. Additionally there have been plans for conducting an ISA test with 30–50 drivers together with the national funded TeleISA project on Intelligent Speed Adaptation.

The actual distribution of the participants will depend on the recruitment method:

- Discussions are ongoing with transport fleet companies to install loggers and nomadic devices in their vehicles. The companies have been generally interested in improving driving habits of the personnel and tracking fuel consumption.
- Discussions are starting with major non-technological organisations and companies, in order to promote being TeleFOT test user to their personnel.
- Use of test user databases or involvement of an external company for the recruitment of test users.
- The city of Oulu will assist in the recruitment of users for FOT2.

**Road Type**

The total length of Finnish road network is 454 000 km, including

- Public Roads 78 000 km of which ~51 000 km is paved. This includes 13 300 km main roads (1–101, including 739 km of motorways) and 13 500 km regional roads.
- Streets 26 000 km
- Other roads (includes private roads, forest truck roads) 350 000 km.

The total amount of kilometers travelled is 53 billion in 2008, from which 67 % (35.6 billion km) on public roads.

Finns make an average of 3 trips a day and use 70 minutes to do so. The distance travelled per day is 42 kilometres per person (Tiehallinto, 2008). 76 % percent of the
mobility is as driver of passenger of a passenger car, 15% by public transport and 5% on foot or bicycle. The average amount of km driven in 2008 with personal vehicles was 16 800 km, with trucks 31 100 km and bus 47 200 km.

93% of passenger traffic and 67% of goods transport takes place on the roadways. Personal transport (total amount of km) has increased 62% in the years 1980–2008, personal car transport 82%. Finland has 3.15 million automobiles which includes 2.7 million passenger cars (Tiehallinto, 2009).

The plan is to include all road types, i.e. urban, peri-urban and highway environments, in order to assess the functions under different road conditions. The road types used will be determined by the participants.

- **Traffic conditions and interaction with other road users**

As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according to the time of day. Therefore, all traffic conditions will be encountered by the participants. The test planning will seek to include the most representative cases. The major congestions are during morning and afternoon rush hours in the Helsinki Metropolitan Area.

**DETAILED FOTS**

- **Instrumented vehicles**

For detailed FOTs requiring driver and environmental monitoring, VTT has been preparing to use a specially instrumented BMW 525dA E61 Touring, model 2008 (Figure 7.). The vehicle is dedicated for testing latest ADAS technology and acquiring research data. It has been instrumented in close co-operation with companies, but TeleFOT has been mentioned in necessary agreements to ensure full use of the data.

The vehicle contains driver assistance systems such as Lane Departure Warning (Mobileye), ACC Stop & Go, HUD and navigation. It holds 3 PCs collecting data from various sensors and systems:

- Two Ibeo LUX laser scanners
- FLIR PathFindIR thermal camera
- Omron high dynamic range colour camera
- CAA module monitoring and interpreting the driver’s eye movement
- Friction estimation (and detection of ice and water) based on a light polarization camera (VTT prototype called IcOR) and vehicle dynamics
- IMU for acceleration and orientation
- Differential GPS
- RDS/TMC interface
- Vehicle CAN
The data collection system is undergoing some development and is expected to be tailored for TeleFOT purposes near the end of 2009. This includes more complete integration of the camera systems and the TeleFOT Cockpit Activity Assessment (CAA) module.

![Diagram of BMW 525dA E61 Touring](VTT Instrumented BMW 525dA E61 Touring from VTT)

In addition to the BMW, other vehicles will be equipped with the CAA module. If possible, some 5–10 vehicles used in the large scale FOTs will be equipped with the CAA module to provide more detailed measurements.

- **Functions to be tested**

  The main purpose of the detailed FOTs in Finland is to assist the LFOTs. The functions under test are therefore almost the same. During the detailed FOTs, the performance indicators which cannot be measured during the large scale FOT, plus a separate case study on nomadic device based eCall will be addressed. The summary of the functions to be tested during the tests are included in the following table.

<table>
<thead>
<tr>
<th>Functions</th>
<th>FOT</th>
<th>DFOT1</th>
<th>DFOT2</th>
<th>BENCHMARKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Speed limit information</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Speed alert</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Navigation support (dynamic)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Green Driving Support</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nomadic device based eCall</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
As can be seen in the table above, and in coordination through the overall test site plans, these functions will be tested in combinations within two Detailed FOTs, in whole Finland, as detailed below:

i) **DFOT1** will include the following functions:

i) **Traffic information**

ii) **Speed limit information**

iii) **Speed alert**

iv) **Navigation support (static)**

v) **Navigation support (dynamic)**

vi) **Green Driving Support**

The test is likely to concentrate on driver monitoring with CAA devices to support LFOT1.

ii) **DFOT2** will include the following functions:

a. **Nomadic device based eCall**

The main scope of the eCall FOT in Finland is to evaluate retrofitted eCall in vehicles. The FOT is concentrated on the following issues:

- Measuring users’ (emergency centres) experiences. eCall-MDS messages will be simulated for different accident scenarios and will be sent to the emergency call training centre. The impact on the risk assessment work of the emergency call centre personnel is evaluated.

- Use of the sensors at the nomadic devices for automatic eCall messages is assessed. Accelerometers have been attached to the nomadic devices in the crash tests by ADAC (task 4.8.3) in order to assess the acceleration imposed to nomadic devices during impact. Based on the results of the crash tests, and on assessment of possible false alarms (e.g. drop on floor) an assessment of the possible use of nomadic devices for automatic eCall is performed.

iii) **WP4.8 benchmarking tests** included usability tests of three devices. Both expert testing and field tests with 10 users have been carried out during 2009. The devices were: TomTom GO 630 Traffic, Nokia 6210 Navigator and NDrive G800R.

None of the users have navigator of their own (three of them have tried friend’s or relative’s navigator). All of the users drive more than 10 000 km/year.

The tests with the users started with various usability tests in a VTT car. Then the users continued to use the devices for 3 weeks as part of their normal life. Data was gathered through usage diaries, web questionnaires and interviews.
• **Devices to be tested**
  During the Detailed FOT, the same devices as during the Large-scale FOTs will be used.

• **Area and test conditions**
  The detailed FOTs address the same environment (participant profile, road type, traffic conditions, weather conditions...) as the large scale FOT.

• **Participants**
  The actual test plans for the detailed FOTs are under discussion and depend on the vehicles available and the final evaluation and assessment objectives. The test users will be likely selected from the LFOT users.
2.2. Central Test Community

2.2.1. United Kingdom

**LARGE SCALE FOTs**

- **Map of the area of the tests**

The LFOT tests will be performed all around U.K (see figure 8) while the DFOTS will tend to be undertaken in the East Midlands area (figure 9) i.e., Nottingham, Leicester and Coventry.

![Figure 8: Map of U.K. where the British L-FOTs will be undertaken](image-url)
Functions to be tested

Two Large-scale FOTs will be performed in U.K. The summary of the functions to be tested during the tests are included in the following table.

Table 4: Functions to be tested and LFOTs planned in the U.K.

<table>
<thead>
<tr>
<th>Functions</th>
<th>FOT</th>
<th>LFOT1</th>
<th>LFOT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Speed limit information</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Speed alert</td>
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<td></td>
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<tr>
<td>Navigation support (static)</td>
<td></td>
<td></td>
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<tr>
<td>Navigation support (dynamic)</td>
<td>(X)</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Green Driving Support</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

More specifically, the functions that will be tested in the Large-scale FOTs are: LFOT1 Green Driving Support and LFOT2 Navigation Support. The LFOTs will test the following functions:

i) **LFOT1** will include the following functions:

a. **Green driving support**

b. **Navigation support (dynamic)**

The functions to be tested in this LFOT will comprise real-time guidance on driving style and fuel efficiency with pre- and post-trip tutoring and feedback.
The system will also provide dynamic navigation support and advice (e.g. hazard warning) based on the interpretation of map data.

ii) **LFOT2** will include the following functions:

a. **Navigation support (dynamic – PND)**

The functions to be tested in this Large-scale FOT will comprise route guidance information presented to the driver as turn-by-turn instructions overlaid on photographic images. The primary device to be tested will be an NDrive PND. However, this LFOT will also undertake a higher level assessment of smart phones used for navigation (via downloadable navigation ‘apps’); this should identify wider device/function issues and also consider issues associated with the delivery of navigation support through a multi-function device. This approach should also provide a degree of future-proofing for the FOT as the long term viability of dedicated PNDs in the market is uncertain.

At present these are only provisional plans; exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2.

- **Devices to be used**

A set of different devices will be used in each LFOT in U.K., according to the objectives and the functions to be tested in each test.

- **LFOT1**: The nomadic device to be used during the trials is an HTC smart-phone/PDA running a bespoke application called SMART Driving Advisor.

![Figure 10: Multi-function in-vehicle information system supported by back-office services](image1)

- **LFOT2**: The nomadic device to be used during the trials is the BLOM PhotoNav application running on an NDrive PND.

![Figure 11. NDrive in vehicle device with on-board navigation instructions and photographic images](image2)
Participants

The actual test plan for the Large-scale FOTs is still under discussion. However, the provisional situation per FOT, as this is discussed within the Test site is provided in this section. The test users will be carefully selected, according to the test plans defined within TeleFOT.

For LFOT1 it is expected that 30 vehicles and units will be equipped with each vehicle being allocated to a single participant for a 3 month period. A total of 120 participants might be included within the 12 month duration of LFOT1.

For LFOT2, a trial involving 100 participants is planned with each participant using a PND in their own vehicle for a period of 3 months. With respect to the smart phone assessment, the number of participants will be dependent on the customer base for appropriate smart phones. If sufficient smart phones are available to the project a trial involving a further 100+ users could be achieved.

Road Type

The plan is to include all road types, i.e. urban, peri-urban and highway environments, in order to assess the functions under different road conditions. The road types used will be determined by the participants.

Traffic conditions and interaction with other road users

As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according the time of day. Therefore, all traffic conditions will be encountered by the participants. The test planning will seek to include the most representative cases.
**DETAILED FOTs**

- **Instrumented vehicles description**
  The exact vehicles to be used for the conduction of the Detailed FOTs in U.K. are still to be determined. Data capture equipment will be allocated in the test vehicles, according to the evaluation and assessment objectives. Provisional plans are that the Detailed FOTs in U.K. will focus on system interface, safety, usability and acceptability issues.

- **Map of the area of the tests**
  The detailed FOTs will be conducted in the East Midlands area, i.e., Nottingham, Leicester and Coventry, and drivers living relatively close to the MIRA/ESRI sites will be involved.

![Figure 13: Nuneaton location and MIRA Proving Ground and Test Site](image)

![Figure 14: Loughborough location ESRI University site](image)
Functions to be tested

The main purpose of the Detailed FOTs in U.K. is to complement the Large-scale FOTs. The functions under test are the same functions as for the Large-scale FOTs. The summary of the functions to be tested during the tests are included in the following table.

Table 5: Functions to be tested and DFOTs planned in the U.K.

<table>
<thead>
<tr>
<th>Functions</th>
<th>FOT</th>
<th>DFOT1</th>
<th>DFOT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Speed limit information</td>
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<tr>
<td>Speed alert</td>
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<tr>
<td>Navigation support (static)</td>
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<td></td>
</tr>
<tr>
<td>Navigation support (dynamic)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Green Driving Support</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

More specifically, the functions that will be tested in the Detailed FOTs are: Green Driving Support (DFOT1) and Navigation support (dynamic via PND and smart phone). The following functions will be tested in within two Detailed FOTs, as detailed below:

iii) DFOT1 will include the following functions:

a. Green driving support
b. Navigation support (dynamic)

c. Traffic information

The functions to be tested in this DFOT will comprise real-time guidance on driving style and fuel efficiency with pre- and post-trip tutoring and feedback. The system may also provide navigation advice and hazard warning.

iv) DFOT2 will include the following functions:

a. Navigation support (dynamic – PND and smart phone)

The functions to be tested in this detailed-FOT will comprise route guidance downloaded to the vehicle and delivered as required on a turn-by-turn basis by a PND with photographic images. The DFOT will also look at the usability and wider impacts associated with the use of navigation applications running on smart phones.

Of course these are only provisional plans; exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2.

Participants

The actual test plan for the detailed FOT is still under discussion. The test users will be carefully selected, matching the average characteristics of the participants of the large scale FOT.

- DFOT1: The detailed FOT will involve drivers living relatively close to the MIRA/ESRI sites. Data capture equipment will be allocated to 3 vehicles to support the detailed FOTs which will focus on system interface, safety, usability and acceptability issues.
- **DFOT2**: The detailed FOT will involve drivers living relatively close to the MIRA/ESRI sites. Within the detailed FOT a standard road-trial experimental design will be implemented with 3 conditions (based on message delivery option: voice, b/w and colour display). Up to 12 users is expected for each condition.

- **Devices to be used**
  The same devices envisioned for the conduction of the LFOTs will also be used in each DFOT (respectively) in U.K.
  - **DFOT1**: The nomadic device to be used during the trials is an HTC smartphone/PDA running a bespoke application called SMART Driving Advisor.
  - **DFOT2**: The nomadic device to be used during the trials is the Blom PhotoNav application running on an NDrive PND. The smart phones that will also be assessed in this FOT will be owned by the participants and the choice of device will be determined by their ability to support navigation applications successfully.

- **Road Type**
  The test route is not yet specifically defined; the plan is to include different road types, i.e. urban, peri-urban and highway environments, in order to assess the functions under different road conditions.

- **Traffic conditions and interaction with other road users**
  As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according the time of day. The test planning will seek to include the more representative cases, following also the planning of the Greek LFOT, for comparability reasons.
  Traffic conditions will be actively sampled in the detailed FOT in an attempt to ensure a range of conditions is included and that the trials are able to keep to a reasonably efficient schedule. This may mean limiting exposure to particularly congested traffic.
2.2.2. Germany

**Detailed FOT**

- **Instrumented vehicle description**

The vehicle used in the German detailed Field Operational Tests is an equipped vehicle. This means that additional hardware is installed inside the vehicle, which is monitoring the environment, the vehicle and the driver during the test runs. In the German DFOT a modified Volkswagen Passat CC is used (shown in the following figure).

![Equipped Vehicle for the DFOTs in Germany (Volkswagen Passat CC)](image)

**Figure 15: Equipped Vehicle for the DFOTs in Germany (Volkswagen Passat CC)**

The vehicle is equipped with a 3.6 l gasoline engine with 300 hP, an all-wheel drive and a double clutch automatic transmission. For the test of the interaction between in-vehicle ADAS functions and ADAS functions based upon nomadic devices, the vehicle is equipped with Adaptive Cruise Control (ACC), Lane Keeping ("Lane Assist"), Forward Collision Warning ("Front Assist") and Xenon Cornering Lights.

To get access to as many information as possible, the vehicle was modified by the Volkswagen research workshop. Here a Gateway has been installed, providing wheel speed, velocity, acceleration in longitudinal and lateral direction, yaw rate, steering angle, steering angle velocity and other information like the actuation of drop arm switches. Additional to the vehicle data object data of the ACC and lane markings of the “Lane Assist” are provided by the gateway. Other criteria like the brake pedal and throttle status can be assessed as well as outer influences like windscreen wiper status and the actuation of other systems, like ABS and ESP, can be logged.

After the modification by VW, IKA adds the data logging hard- and software into the trunk. For the conduction of the test runs other modules like the Cockpit Activity...
Assessment module (CAA) and the traffic and environment assessment module (ECA) has been or will be integrated into the vehicle. The nomadic device about to be tested will be mounted properly in the drivers field of view inside the test vehicle.

- **Map of the area of the tests**

The detailed field operational test in Germany will be conducted in the region between Cologne and Aachen.

![Figure 16: Aerial view of the area for the detailed FOT in Germany (between Aachen and Cologne)](image1)

![Figure 17: Map of the test area for the detailed FOT in Germany (between Aachen and Cologne)](image2)
Functions to be tested

The main purpose of the detailed FOT in Germany is to assess the interaction between ADAS functions based on nomadic devices and ADAS functions integrated into the vehicle infrastructure. Therefore the German DFOT is separated into three different test setups, in which different ADAS functions are tested in combination. The functions under test are summarised in the following table.

Table 6: Functions to be tested and DFOTs planned in Germany

<table>
<thead>
<tr>
<th>Functions</th>
<th>DFOT</th>
<th>DFOT1</th>
<th>DFOT2</th>
<th>DFOT3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed limit information</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed alert</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Forward Collision Warning</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive Cruise Control</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lane Keeping</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

In the German DFOT several nomadic device functions are to be tested. These functions are speed limit information and speed alert as well as static navigation support. Furthermore the interaction between ADAS functions based on nomadic devices and ADAS functions integrated into the vehicle infrastructure will be assessed. Therefore the in-vehicle functions Forward Collision Warning, Adaptive Cruise Control and Lane Keeping are tested additionally to the nomadic device functions, named above. The exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2.

Devices to be used

The nomadic device to be used during the Detailed FOTs in the German test site is The NDrive G800 PND of BLOM, on which the Photo Nav navigation software, also provided by BLOM is installed.
The software has been customised for the TeleFOT project, so that the user interaction (pushing of buttons, use of functions etc.) can be logged on the device for the subsequent evaluation.

- **Participants (No, characteristics, etc)**

In the German DFOT a number of 10 participants will be taking part in the test rides. The test subjects should be of different gender, age, background and driving experience, so that a representative and comparable image of the road users will be represented. The test subjects will be chosen from the IKA test subject pool. The German DFOT is carried out in an attended study design, which means that the driver is accompanied by an assistant, controlling the run of the tests. All test runs should hold a duration of approximately 2 hours, with a driving performance of about 200 km. In the execution phase every test subject has to drive the route in different system configurations, only ADAS, only nomadic device and ADAS and nomadic device available. During the tests all data available in the equipped test vehicle (see vehicle description) will be logged during the test run. To enhance the data logged inside the vehicle, the test subjects have to fill in different questionnaires regarding, e.g. user uptake and work load. Subsequent to the tests the retrieved data will be pre-processed, enriched and uploaded to the central TeleFOT data base.

- **Road Type**

The test route is not specifically defined. Because of the focus on the interaction between internal and nomadic ADAS functionalities, a route on which as many ADAS functions as possible can be tested is chosen. Due to the fact that functions like ACC and Lane Keeping are designed to be used on well developed roads, like highways or main roads, the tests will be mainly conducted on these type of roads.

To ensure that systems, like ACC or dynamic navigation support, become active during the comparatively short test runs, a route on which the traffic density allows to use the
tested systems has to be chosen. For the tests, the conditions in the test area between Cologne and Aachen should be suitable for the planned tests.

- **Traffic conditions and interaction with other road users**

As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according to the time of day. The test planning will seek to include the more representative cases.

The test period shall range over a time span of 6 months, so that the tests will be conducted under changing weather conditions and in different seasons. Due to the length of the test period and the number of conducted tests seasonal effects, like icy conditions, and effects of weather conditions should be levelled over the period of testing. To avoid assessing short term effects all drivers are travelling the test routes several times in all of the three modes (ADAS and PND, ADAS only and PND only).

2.2.3. France

**LARGE SCALE FOTS**

- **Map of the area of the tests**

FFOT will mainly take place in the Alsace-Franche Comté region (see Figure 18).

![Map of the area of the tests](image)

*Figure 19: The region of Alsace-Franche Comté where the French FOT will be conducted.*
• Functions to be tested

The functions under test are summarised in the following table.

**Table 7: Functions to be tested and LFOTs planned in France**

<table>
<thead>
<tr>
<th>Functions</th>
<th>LFOT</th>
<th>LFOT1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nomadic device based eCall</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

The main purpose of the work is to setup a large-scale FOT to test the eCall system. The primary function to be tested is the emergency Call. Advanced FCD and RTI services based on nomadic devices usage will also be tested.

The test set up and experiments will be conducted in three stages:
- Study and analysis of user needs and expectations such as HMI, type of information (audio, text, etc), manual or automatic.
- Survey main technologies that have been investigated in current eCall systems such as interfaces and interactions between nomadic devices and emergency Calls centers and PSAPs.
- Develop the eCall functionalities/services and test its conformity to users’ needs and expectations.

• Nomadic devices to be used

Different types of PND (Personal Navigation Devices) and Smart Phones will be used during the tests such as (a) Danew GS 410 and (b) Nokia (Figure 20).

![Nomadic devices to be used in the French LFOT](image)

**Figure 20: Nomadic devices to be used in the French LFOT**

• Participants

The French LFOT will involve more than 400 drivers using their own vehicles from “Alsace-Franche-Comté” region equipped with devices to be provided by UTBM. The experiments will be conducted with the collaboration of public and private associated
partners (e.g., insurance companies). A sophisticated classification method of drivers based on, for example profession, age, will be used to establish more diversified drivers’ community.

- **Road type**
  The experiments will be conducted on different road types (highway, urban, etc), so as to emphasize the potential uses of eCall system and study the drivers’ behavior with regards to various driving environments.

- **Traffic conditions and interaction with other road users**
  The experiment will be conducted under different traffic conditions from light (urban roads) to heavy traffic (highways).
2.3. Southern Test Community

2.3.1. Italy

**LARGE SCALE FOTs**

- **Map of the area of the tests**

The large scale FOT will be performed in Reggio Emilia, province of the Emilia Romagna region, in Northern Italy.

*Figure 21: Reggio Emilia in Northern Italy where the Italian LFOTs will be conducted.*
• **Functions to be tested**

One Large-scale FOT testing all functions concurrently is at the moment planned in Italy. The summary of the functions to be tested during the tests are listed in the following table.

<table>
<thead>
<tr>
<th>Functions</th>
<th>LFOT</th>
<th>LFOT1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Speed limit information</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Speed alert</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Navigation support (dynamic)</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

i) **LFOT1** will therefore include the following functions:

   - **Traffic information**
   - **Speed limit information**
   - **Speed alert**
   - **Navigation support (static)**
   - **Navigation support (dynamic)**

   Traffic information will be provided by national databases, and will be delivered via TMC.

Of course these are only provisional plans; exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2.

• **Nomadic Devices to be used**

The nomadic devices to be used during the LFOT trial are both PNDs and navigation-equipped smart phones. Discussions are on going, regarding the possibility of using the Nokia360 smart phones, however, some technical details are still to be clarified. In addition, it should be mentioned that all the vehicles will be equipped with MetaSystem’s Clear Box, which will mainly be used for data logging purposes.

• **Participants (No, characteristics, etc)**

The actual test plan for the LFOT is still under discussion. A sample will be defined (aiming at 300), aiming to represent different kinds of vehicles (e.g.: cars, vans and trucks). Recruitment will take into account driving experience (i.e. average Km. driven per year), age, gender, profession: participants will be recruited among drivers who comply with a minimum 10000 Km./year experience; a pre-screening will also attempt to define which part of the yearly distance driven belongs to "usual roads" (criteria for "usual" are to be defined).
A differentiation will be made between professional and private drivers. Contacts are underway to recruit drivers from public and corporate fleets, as well as from private transportation companies.

- **Road Type**

The plan is to include different road types, in order to assess the functions under different road conditions. Extra-urban, urban, residential and rural scenarios will be addressed, as well as access to the A1 Motorway (backbone of road transports).

- **Traffic conditions and interaction with other road users**

As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according the time of day.

**Detailed FOTs**

The Detailed FOT will be based in Turin, in northwest Italy, capital of the Piedmont region.

![Map of Italy with Turin highlighted](image)

*Figure 22: Turin in the North of Italy where the Italian DFOT will be conducted*
• **Functions to be tested**

The main purpose of the detailed FOT in Italy is to complement the large scale FOT. Therefore, the functions under test are the same functions as for the Large-scale FOT, as shown in the following table.

**Table 9: Functions to be tested and DFOTs planned in Italy**

<table>
<thead>
<tr>
<th>Functions</th>
<th>DFOT</th>
<th>DFOT1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Speed limit information</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Speed alert</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Navigation support (dynamic)</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

ii) **DFOT1** will be conducted in Turin and will include the following functions:

a. **Traffic information**

b. **Speed limit information**

c. **Speed alert**

d. **Navigation support (static)**

e. **Navigation support (dynamic)**

Traffic information will be provided by national databases, and will be delivered via TMC.

Of course these are only provisional plans; exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2. During the detailed FOT, the performance indicators, which cannot be measured during the large scale FOT, will be addressed.

2.3.2. Spain

**LARGE SCALE FOTS**

• **Map of the area of the tests**

One of the test sites in Spain will be located in the area of Valladolid, a mid size city, located in Castilla y León region, in the North-West of Spain. In this area the Spanish LFOT1 will be conducted.
The second test site in Spain will be based in the city of Madrid.
• Functions to be tested

The functions tested in Spain are summarised in the following table.

Table 10: Functions to be tested and LFOTs planned in Spain

<table>
<thead>
<tr>
<th>Functions</th>
<th>LFOT</th>
<th>LFOT1</th>
<th>LFOT2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Speed limit information</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Speed alert</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Navigation support (dynamic)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green driving support</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

In the Spanish test sites, two LFOTs are planned, as shown in the table above. The functions to be tested are traffic information, speed limit information and speed alert as well as static navigation support and green driving support. The exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2.

i) LFOT1 will be focused on the following functions:
   a. Navigation support (static), including real image
   b. Speed limit information
   c. Speed alert

Testing of the Speed cameras alert functions has been discussed, however this function will most probably be abandoned from the test plans, as commonalities across the test sites are sought.

ii) LFOT2 will be focused on the following functions:
   a. Traffic information
   b. Speed limit information
   c. Green driving support

The FOT participants will be provided with real time traffic information of the main road arterials of the city, as well as information on maximum speed and incidences and green driving support.

• Nomadic Devices to be used

Two different types of devices will be used in the Spanish LFOTs:

- LFOT1: The nomadic device that will be used in the L-FOT Spanish Valladolid test site is the navigation device NDrive G800. NDrive G800 is a personal navigation solution based on GPS technology. It provides navigation through visual and voice instructions, which includes names of roads and locations, door-to-door navigation and detailed information about points of interest in several languages. As an added value, the NDrive G800 uses real photos in perspective to show another way to navigate in its screen.
Figure 25: The navigation device NDrive G800

- **LFOT2**: The nomadic device to be used during the field tests in Madrid will be an enhanced version of the new Vexia Econav, a navigation device which, apart from the normal navigation support, includes the green driving support functionalities that provides the user with information on which gear to use and when to change gears in order to reduce fuel consumptions. These devices will be properly modified in order to able to receive the real time traffic information provided by ETRA.

Figure 26: Vexia Econav

- **Participants (No, characteristics, etc)**

The actual test plan for the detailed FOT is still under discussion. The minimum number of participants involved is 200.

- **LFOT1**: The final number of users is still under discussion in order to take into account the most appropriate experimental design according to the project and the test site objectives, but also, the final decision of other test sites with the objective to reach a common assessment among different test sites (same functions, same type of sample, same conditions, etc.). Nevertheless, the number of subjects would be around 100 drivers.

- **LFOT2**: The drivers to participate in Madrid LFOT will be recruited among the users of Vexia devices. These drivers will be provided with the enhanced Vexia devices
which would have been modified in order to be able to provide the functionalities required for this LFOT. The drivers participating in Madrid FOT will presumably need to go through a training process to learn to use the new functionalities and to be introduced to the LFOT in particular and to TeleFOT in general. The target of the Madrid Large FOT is to reach around 100 participants.

The test users will be carefully selected; different variables will be considered during the subjects’ recruitment process in order to achieve a suitable representation of the population under study. Thus, aspects such as age, gender and driving experience will be considered among others.

- **Road Type**
  
The plan is to include different road types, i.e. urban, peri-urban and highway environments, in order to assess the functions under different road conditions.

- **Traffic conditions and interaction with other road users**
  
As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according the time of day.

### Detailed FOTs

- **Map of the area of the tests**
  
The Detailed FOT will be conducted in the province of Valladolid, located in the North-West of Spain (see LFOT1 map).

- **Functions to be tested**
  
The functions tested in Spain are summarised in the following table.

<table>
<thead>
<tr>
<th>Functions</th>
<th>DFOT</th>
<th>DFOTi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed limit information</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Speed alert</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Navigation support (dynamic)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green driving support</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the Spanish DFOT the functions to be tested are speed limit information and speed alert as well as static navigation support. The exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2.

1) **DFOTi** will be focused on the following functions:

   a. **Navigation support (static), including real image**
b. Speed limit information

c. Speed alert

Testing of the Speed cameras alert functions has been discussed, however this function will most probably be abandoned from the test plans, as commonalities across the test sites are sought. Detailed tests are planned to be carried out as a complement to the LFOT1 Spanish tests performed in Valladolid with the aim of exploring in-depth drivers’ behaviour when making use of particular driving functions. Thus, the same functions will be considered within the DFOT.

• Nomadic Devices to be used

The Detailed FOT will be a complement of the LFOT1 and therefore, the same nomadic device (navigator) will be used, namely NDrive G800.

• Participants (No, characteristics, etc)

The actual test plan for the detailed FOT is still under discussion. The overall number of participants will depend on the final decision about the experimental design to be considered within the detailed FOT. This test design will define the experimental conditions and as a consequence, the number of groups and the needed number of participants in each of them. Nevertheless, the expected number of participants would be around 20 drivers.

• Road Type

The detailed FOT will be conducted in Valladolid area and as far as possible, different types of roads will be covered within the trials (urban, extra-urban, rural and motorway) in order to consider several road features such as number of lanes, level of road curvature, speed limits, traffic densities, etc.

• Traffic conditions and interaction with other road users

The area of the DFOT trials will be selected according to different layouts and features (traffic conditions and environmental aspects such as signs, road markings, speed limits, etc.) in order to include different conditions in the subsequent analysis. Therefore, traffic information will be used in order to select the most suitable routes.
2.3.3. Greece

**LARGE SCALE FOTs**

- **Map of the area of the tests**

The tests are going to be performed in the city of Athens and the surrounding area.

![Map of Athens and surrounding area](image)

*Figure 27: Athens and the surrounding area where the Greek LFOTs will be conducted.*
• Functions to be tested

The functions under test are summarised in the following table.

Table 12: Functions to be tested and LFOTs planned in Greece

<table>
<thead>
<tr>
<th>Functions</th>
<th>LFOT1</th>
<th>LFOT2</th>
<th>LFOT3</th>
<th>LFOT4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Speed limit information</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed alert</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

More specifically, the functions that will be tested in the Large-scale FOT are: Traffic information, Speed limit information, Speed alert, and Navigation support (static). Discussions on including the nomadic-device based eCall tests in the planning are also taking place within the consortium. As it can be seen in the table above these functions will be tested in combinations within four Large-scale FOTs, in the area of Athens, as detailed below:

i) LFOT1 will include the following functions:
   a. Navigation support (static)

ii) LFOT2 will include the following functions:
    a. Speed limit information
    b. Navigation support (static)

iii) LFOT3 will include the following functions:
    a. Traffic information
    b. Navigation support (static)

iv) LFOT4 will include the following functions:
    a. Speed Alert
    b. Navigation support (static)

Of course these are only provisional plans; exact test plans are defined in WP3.4 (D3.4.1), taking into account the results of WP2.2 and WP2.3 of SP2.

• Participants (No, characteristics, etc)

The actual test plan for the Large-scale FOT is still under discussion. The minimum number of participants involved is 50 participants as control group, plus 50 participants per FOT, depending on the test experiment. The test users will be carefully selected, matching the average characteristics of the participants of the large scale FOT.
• **Road Type**
The plan is to include different road types, i.e. urban, peri-urban and highway environments, in order to assess the functions under different road conditions.

• **Traffic conditions and interaction with other road users**
As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according the time of day.

### DETAILED FOTs

• **Instrumented vehicle description**
The CERTH/HIT’s research vehicle will be used for the realisation of the Greek DFOT. It is a Lancia Thesis, 2.4 Emblema which has been equipped with various Advanced Driver Assistance Systems (sensors, cameras, radar, etc.), to be used for experimental evaluation of new systems, certifying their contribution in driver assistance. A data recording system has been created (CAN-bus), which includes documents, measurements and pictures (i.e. driver’s face, exterior environment). Graphics design and data visualization with video are also possible.

![Figure 28: The Greek Detailed FOT vehicle and functions](image)

Below some information on the main research vehicle equipment is provided.
- **Lane Detection System**

<table>
<thead>
<tr>
<th>Sensor/Subsystem</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane detection system and lane departure warning Supplier: CRF (FIAT Centre of Investigations). The main components of the system are: a <strong>CCD camera</strong> and a <strong>processing unit</strong>.</td>
<td></td>
</tr>
</tbody>
</table>

**Brief technical description**
A standard CCIR video signal (from CCD camera) is processed by our system in order to recognize lane borders and to estimate, in addition to lane width, the position and the orientation of the car respect to them.

- **Display And Touchscreen Integrated In The Dashboard**

<table>
<thead>
<tr>
<th>Sensor/Subsystem</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCD and Touchsceen Supplier: VDS/CRF</td>
<td></td>
</tr>
</tbody>
</table>

**Brief technical description**
This LCD monitor is connected to the Video Output of the LOG_PC through an electronic interface; The use is mainly intended to develop specific interfaces between the experimental vehicle system and the driver. The subsystem includes the LCD, touchscreen and an electronic interface box.
- Frontal Radar

<table>
<thead>
<tr>
<th>Sensor/Subsystem</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>RADAR SENSOR Supplier: FUJITSUTEN.</td>
<td></td>
</tr>
</tbody>
</table>

Brief technical description

RADAR SENSOR is a detector able to track the position of obstacles in front of the vehicle. The data of this sensor are transferred by CAN bus. To PC_LOG.

- Driver Warning System (DWS Mirror – Seat Belt Vibration)

<table>
<thead>
<tr>
<th>Sensor/Subsystem</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier: CRF</td>
<td></td>
</tr>
</tbody>
</table>

Brief technical description

The mirror has got four LEDs for warning messages. Each of them shows the user the frontal collision status. The green LED means that the status of frontal collision is zero; the orange one that the status is in middle level and the red one shows the high level of status. When the red LED is lighted, a seat belt vibration is also enabled. This condition informs the driver there is a frontal collision.

- Industrial PC (log_pc)

<table>
<thead>
<tr>
<th>Sensor/Subsystem</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Personal Computer Supplier: CONTRADATA / ICP</td>
<td></td>
</tr>
</tbody>
</table>

Brief technical description

This unit takes input from all sensors (vehicle sensors, radar, lane detection, GPS localization), laborate them, store and show all data with a specific program developed for the customer by CRF.
Moreover, for the needs of the TeleFOT DFOT, the same device that will be used for the Greek LFOT, will also be adjusted to the research vehicle.

The exact sensorial system of the vehicle is under specification according to the hypothesis to be addressed in the Greek detailed FOTs developed under WP2.2, the final test tools specifications developed under WP3.2 and taking also into account the existing sensorial system of the vehicle.

- **Map of the area of the tests**

The tests are going to be performed in the city of Thessaloniki and the surrounding area.

![Map of Thessaloniki and the surrounding area](figure29.jpg)

**Figure 29:** Thessaloniki and the surrounding area where the Greek DFOT will be conducted.

- **Functions to be tested**

The main purpose of the detailed FOT in Greece is to complement the large scale FOT, and to assess the interaction between ADAS functions based on nomadic devices and ADAS functions integrated into the vehicle infrastructure. The functions under test are the same functions as for the large scale FOT, plus a list of in-vehicle functions.
Table 13: Functions to be tested and DFOTs planned in Greece

<table>
<thead>
<tr>
<th>Functions</th>
<th>DFOT1</th>
<th>DFOT2</th>
<th>DFOT3</th>
<th>DFOT4</th>
<th>DFOT5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic information</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed limit information</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed alert</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Navigation support (static)</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Navigation support (dynamic)</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Forward Collision Warning</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Lane Departure Warning</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

More specifically, the functions that will be tested in the detailed FOT are: Traffic information, Speed limit information, Speed alert, Navigation support (static), Forward Collision Warning and Lane Departure Warning. As it can be seen in the table above, and in coordination with the Greek Large scale FOT, these functions will be tested in combinations within five detailed FOTs, mainly in the area of Thessaloniki (except for DFOT3 that will be conducted in Athens). Four Detailed FOTs will test the same functionalities as in the four Large-scale FOTs respectively, complemented with ADAS functions (Forward Collision Warning and Lane Departure Warning), while the fifth FOT will test the stand alone ADAS functions, as detailed below:

i) **DFOT1** will be conducted in Thessaloniki and will include the following functions:
   a. Navigation support (static)
   b. Forward Collision Warning
   c. Lane Departure Warning

ii) **DFOT2** will be conducted in Thessaloniki and will include the following functions:
   a. Speed limit information
   b. Navigation support (static)
   c. Forward Collision Warning
   d. Lane Departure Warning

iii) **DFOT3** will be conducted in Athens and will include the following functions:
   a. Traffic information
   b. Forward Collision Warning
   c. Lane Departure Warning

iv) **DFOT4** will be conducted in Thessaloniki and will include the following functions:
   a. Speed Alert
b. Navigation support (static)
c. Forward Collision Warning
d. Lane Departure Warning

v) **DFOT5** will be conducted in Thessaloniki and will include the following functions:

a. Forward Collision Warning

b. Lane Departure Warning

Of course these are only provisional plans; exact test plans are under definition in WP3.4, taking into account the results of WP2.2 and WP2.3 of SP2. During the detailed FOT, the performance indicators, which cannot be measured during the large scale FOT, will be addressed and, additionally, the interaction of the TeleFOT functions with ADAS will be investigated.

- **Participants (No, characteristics, etc)**

  The actual test plan for the detailed FOT is still under discussion. The minimum number of participants involved is 10. The test users will be carefully selected, matching the average characteristics of the participants of the large scale FOT.

- **Road Type**

  The test route is not yet specifically defined; the plan is to include different road types, i.e. urban, peri-urban and highway environments, in order to assess the functions under different road conditions.

- **Traffic conditions and interaction with other road users**

  As mentioned above, different road types will be addressed in the tests. Consequently, the traffic conditions will vary according to the environment and also according the time of day. The test planning will seek to include the more representative cases, following also the planning of the Greek LFOT, for comparability reasons.

  It should be noted that even though the Greek LFOT and DFOT are not taking place in the same city (LFOT in Athens, DFOT in Thessaloniki) the test planning is aiming at providing similar test environment in both cases, mainly in terms of participant profile, road type, traffic conditions, etc. Both cities are big metropolitan areas, combining and interconnecting different road types and experiencing similar traffic conditions, as well as daily and yearly traffic variations.
CONCLUSION

The scope of this deliverable is to present the TeleFOT test communities, which are being built in order to facilitate the execution of the project FOTs. For Large and Detailed FOTs, it has presented the objectives of the testing, the functions tested and the overall set up of each test site. In addition, the differences and synergies between Detailed FOTs and Large-scale FOTs is also presented in this deliverable, as an important element of the TeleFOT concept.

The next steps will be to fine-tune the test communities set up with the TeleFOT framework, the final set of hypotheses to be addressed and the TeleFOT experimental design, taking into account the differentiations of each test site and the various organisational details per country participating in this pan-European test bed. Therefore the final set-up of the TeleFOT test communities will be further updated and enhanced in the course of the project. The updated description will be presented in TeleFOT deliverable 3.3.1, which will be provided before the initiation of the TeleFOT FOTs. The final set-up of the TeleFOT test communities and test sites will be provided in the TeleFOT deliverable 3.3.2, which will be provided in the initial phases of the FOTs, taking into account the final arrangements in material and organisational levels of all the test communities. In this way, the deliverable will reflect the actual set-up applied in the TeleFOT test communities and test sites.
REFERENCES: