

## Annex A FOT Implementation Plan (FOTIP)

### Checklist for setting up and conducting a Field Operational Test – Annex A from the [FESTA Handbook](#) (2021)

The FOT Implementation Plan (FOTIP) is part of the FESTA handbook, and can be found in Annex A. The FOTIP is intended to serve primarily as a checklist for planning and running FOTs:

- To highlight the main activities and tasks, and critical issues.
- To highlight the “dos” and “don’ts” of running an FOT.
- To provide a consistent framework for planning, running and decommissioning FOTs.
- This checklist may be also useful for CCAM projects performing real world tests.

**(To be read in conjunction with Chapter 2 of the [FESTA Handbook](#))**

## FOT Teams and People

1. Research Institute contracted to run FOT
2. Project Manager
3. Research Team
4. Technical Support Team
5. Administrative Support Team
6. Project Steering Committee
7. Project Management Team
8. Accounting/Auditing Advisor
9. Legal and Ethical Advisors
10. Sub-Contractors
11. Public Relations and Communications Advisor
12. Project Sponsor(s)

<b>Activity 1: Convene FOT teams and people</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>1.1 Appoint the FOT project manager</b>	Research Institute contracted to run FOT	<input type="checkbox"/>
<b>1.2 Appoint the research team</b>	Project Manager	<input type="checkbox"/>
<b>1.3 Appoint the technical support team</b>	Project Manager, Project Steering Committee	<input type="checkbox"/>
<b>1.4 Appoint the administrative support team</b>	Project Manager	<input type="checkbox"/>
<b>1.5 Appoint team leaders in each of the research, technical and administrative teams</b>	Project Manager	<input type="checkbox"/>
<b>1.6 Appoint the project steering committee</b>	Project Manager, Project Steering Committee, Project Management Team, Public Relations and Communications Advisor, Project Sponsor(s)	<input type="checkbox"/>
<b>1.7 Appoint the project management team (for day-to-day management</b>	Project Manager	<input type="checkbox"/>
<b>1.8 Appoint the accounting/auditing advisor</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>1.9 Appoint a legal and ethics advisor</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>1.10 Appoint sub-contractors</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>1.11 Appoint a public relations/communications advisor</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>1.12 Sign off on the agreed research and support structure</b>	Project Manager, Project Management Team, Administrative Support Team, Accounting/Auditing Advisor, Project Sponsor(s)	<input type="checkbox"/>

**Critical Considerations (the “dos” and “don’ts”)***(Italics emphasise the most important items)*

- ✓ While the project manager must have knowledge of all activities, ensure that critical knowledge is not vested in just one person. Personnel, including the project manager, may leave the project. *Ensure that there is “standby” for all key research and management roles within the FOT.*
- ✓ Appoint early someone to deal with human participants/ethics committee issues.
- ✓ Include in the research team someone who is a “gizmo” expert – who has up-to-date knowledge about current ICT/ITS developments and capabilities. Database and geographical information system (GIS) expertise is also critical.
- ✓ Ensure the project management team meets regularly (about once a month) to resolve research issues, monitor timelines and budgets, and resolve administrative, technical and other issues.
- ✓ *Choose contractors that can guarantee that, if a staff member leaves or is ill, there is sufficient expertise and capacity to maintain project continuity.*
- ✓ Maintain good relations with other partners involved in the FOT.
- ✓ *Ensure that the FOT evaluation process will be, and be recognised as, independent.*
- ✓ It is not necessary to appoint all teams/people at the same time – appointments should coincide with project needs, It is, however, necessary that the project management team is able to ensure coverage of the different aspects, eventually asking for support from specific experts in specific domains.
- ✓ Identify a final internal arbiter, acceptable to all parties, who can resolve scientific, administrative, legal and other disputes.
- ✓ Decide early in the project the frequency and timing of project Steering Committee meetings.

**General Advice**

Although this Activity precedes Activity 2, the choice of teams and people will be determined to some extent by the aims and objectives of the FOT.

- ✓ Appoint a project manager with excellent research, project management and communication skills. (Note: In some FOTs, the FOT project manager is responsible for both the administrative and scientific management of the FOT. In other FOTs, a senior researcher may be responsible for the scientific, but not the administrative, management of the FOT. This requirement will depend on the scale of the FOT.)
- ✓ The research team should be multi-disciplinary and would typically include psychologists, civil, mechanical, electrical and electronics engineers, statisticians, human factors experts, traffic safety experts, and socio-economic modelling experts.
- ✓ The technical support team would normally include computer software engineers, communications engineers, mechanical, traffic, civil and electronic engineers, and GIS experts.
- ✓ The project Steering Committee sets the strategic direction of the project and keeps it aligned with the project aims and objectives. Normally it would include the FOT project manager, selected members of the research and project management teams (e.g. team leaders), along with key stakeholders and the sponsor(s). Members should have authority to commit their organisations to the aims, objectives and implementation of the FOT. For smaller FOT projects, the stakeholder committee may not be necessary.

- ✓ The project management team is led by the FOT project manager and includes selected members of the research (e.g. team leaders), technical and administrative teams.
- ✓ A legal advisor should support the FOT over the full duration of the project (a lawyer's office providing advice whenever needed is sufficient). Legal knowledge must be available on the legal situation in the country in which the FOT is conducted.
- ✓ Define all necessary steps including all activities as soon as possible. Even little things can cause big problems.
- ✓ Adapt regularly the planning of analysis tasks in accordance with deviations from the original project plan; elaborate on the consequences.
- ✓ Open communication with regards to project monitoring to reduce expectations, should things go wrong in the implementation and data acquisition phase.
- ✓ It is recommended that experts of phases not immediately operating (e.g. data analysis) are involved in the overall FOT/NDS process from the very beginning, not only focusing on the specific task.
- ✓ The same is also recommended involving the right people in the interactions and iterations between planning, using, and analysing.
- ✓ The status of the project should be diffused to all relevant team members, including those not yet directly involved.

## Activity 2: Define aims, objectives, research questions and hypotheses

Tasks and Sub-Tasks	Person/Team/Organisation Responsible for Activity	Done
<b>2.1 Define the aims and objectives of the FOT, in conjunction with relevant stakeholders</b>	Project Manager, Research Team, Technical Support Team, Project Steering Committee	<input type="checkbox"/>
<b>2.2 Identify systems and functions to be tested</b>	Project Manager, Research Team, Technical Support Team, Project Steering Committee	<input type="checkbox"/>
<b>2.3 Identify use cases/situations in which systems and functions are to be tested</b>	Project Manager, Research Team, Technical Support Team, Project Steering Committee	<input type="checkbox"/>
<b>2.4 Define the research questions and prioritise them</b>	Project Manager, Research Team, Technical Support Team, Project Steering Committee	<input type="checkbox"/>
<b>2.5 Formulate hypotheses to be tested, deriving from research questions</b>	Project Manager, Research Team, Technical Support Team, Project Steering Committee	<input type="checkbox"/>
<b>2.6 Determine the constraints which may prevent the aims and objectives from being met</b>	Team Project Manager, Research Team, Technical Support Team, Project Steering Committee, Project Management Team	<input type="checkbox"/>

<p><b>2.7 Define the final aims and objectives of the FOT, and seek agreement from relevant stakeholders</b></p>	<p>Project Manager, Research Team, Technical Support Team, Project Steering Committee</p>	<p><input type="checkbox"/></p>
<p><b>2.8 Sign off on the aims and objectives of the FOT</b></p>	<p>Project Manager, Research Team, Technical Support Team, Project Steering Committee, Project Management Team, Public Relations and Communications Advisor, Project Sponsor(s)</p>	<p><input type="checkbox"/></p>

<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ Be prepared for the potential for FOT aims and objectives to change when new administrations come in.</li> <li>✓ Be prepared for potential conflict in objectives by different stakeholders; e.g. a car manufacturer wants a deep understanding of product use and driver behaviour and acceptance, while public authorities are more interested in determining the impact of system use on traffic and on the transport system.</li> <li>✓ Check that use cases may be practically tested and reproduced with the requested statistical relevance in order to avoid that unfeasible use cases (and related research questions and hypotheses) are discarded in the successive steps.</li> <li>✓ Ensure that all terms and phrases making up the research questions and hypotheses are clearly defined and unambiguous. This will facilitate interpretation of the FOT outcomes and comparisons with previous and future FOTS.</li> </ul>
<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ See the FESTA Handbook for further advice on defining the aims, objectives, research questions and hypotheses for an FOT.</li> <li>✓ Constraints which may prevent the aims and objectives from being met might include cost, lack of supporting infrastructure, time, willingness and commitment of key stakeholders to cooperate in providing supporting infrastructure, their likely support in promoting the aims and objectives of the FOT, the availability of appropriate data, etc.</li> <li>✓ Commonly cited aims are:             <ul style="list-style-type: none"> <li>- Evaluate system(s) effectiveness in changing behaviour and performance</li> <li>- Evaluate driver acceptance of system(s), including willingness to purchase</li> <li>- Evaluate system technical operation</li> <li>- Stimulate societal demand for new technologies</li> <li>- Evaluate safety impacts</li> <li>- Evaluate environmental impacts</li> <li>- Evaluate impacts on traffic (e.g. congestion, mobility)</li> <li>- Evaluate socio-economic cost-benefits</li> </ul> </li> </ul>

<ul style="list-style-type: none"> <li>- Evaluate commercial impacts (e.g. productivity, return on investment, direct cost savings, incremental revenues by getting more customers, customer loyalty, etc.)</li> </ul> <p>✓ Defining the research questions and prioritising them at an early stage will ensure they stay at the focus of the FOT and help protect from subsequent “mission creep”.</p>
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<b>Activity 3: Develop FOT project management plan</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>3.1 Define the project activities, tasks and sub-tasks</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>3.2 Decide who is accountable for completion of activities, tasks and sub-tasks</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>3.3 Determine timelines for completion of activities, tasks and sub-tasks</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>3.4 Determine the budget for project activities, tasks and timelines</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>3.5 Develop a project GANTT chart to guide project management</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>3.6 Implement procedures for monitoring project activities, timelines, budgets and resources (e.g. project management team meetings)</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>3.7 Undertake a risk assessment for the FOT and plan contingencies as required</b>	Project Manager, Project Management Team, Risk Management Consultant	<input type="checkbox"/>
<b>3.8 Determine sign-off procedures (meetings and documents) to ensure there is sign-off on all critical decisions and stages of FOT by all relevant parties</b>	Project Manager, Project Management Team	<input type="checkbox"/>
<b>3.9 Agree on project issues which are confidential, and implement mechanisms for safeguarding their confidentiality</b>	Project Manager, Project Management Team, Project Sponsor(s)	<input type="checkbox"/>
<b>3.10 Develop a manual for conducting the FOT that documents critical procedural knowledge</b>	Project Manager, Research Team, Technical Support Team	<input type="checkbox"/>

**Critical Considerations (the “dos” and “don’ts”)**

- ✓ *Include in the total budget some “contingency” that can be used to pay for unforeseen activities and tasks (especially meetings) that cannot be anticipated. 5 -10 percent of the total project cost is recommended. Different elements of the project may require different proportions of this contingency. It should be held and allocated by the project manager, not sub-activity leaders or partners.*
- ✓ *Identify and document in the GANTT chart the dependencies that exist between different activities, tasks and sub-tasks.*
- ✓ *Anticipate the need and budget for specialist consultants with skills and expertise that does not exist within the project team (e.g. training experts, software developers, lawyers etc.)*
- ✓ *Where relevant, anticipate changes to 3<sup>rd</sup> party vehicle fleets (e.g. vehicle upgrades and changes in operating routes) during the course of the FOT.*
- ✓ *Be aware that technical efforts are most likely to incur risk in terms of time and budget (especially the hardening up/refinement of systems, where these are developed within the FOT)*
- ✓ *Don’t under-estimate the time required and the cost of designing, running, analysing and de-commissioning the FOT. It will be greater than you think.*
- ✓ *Assume that some further modifications to, and fine tuning of, the project management plan will be required. It is impossible to foresee everything that is required in running an FOT.*
- ✓ *Develop procedural manuals for those conducting the FOT to ensure that, if staffs leave, all procedural knowledge does not leave with them. These should be developed for each activity.*

**General Advice**

- ✓ *Documentation of all project meetings is critical to record critical decisions, document the lessons learnt and justify possible blowouts in budgets and timelines.*
- ✓ *A budgeting structure that accommodates the uncertainties associated with running FOTs is desirable; e.g. a series of prospective budgets for each critical stage of the FOT.*
- ✓ *Be aware that in some jurisdictions project papers from publicly funded projects are public documents and copies can be requested by members of the public.*

**Activity 4: Implement procedures and protocols for communicating with stakeholders**

Tasks and Sub-Tasks	Person/Team/Organisation Responsible for Activity	Done
4.1 Commission a communications advisor to design communications plan	Project Manager, Project Management Team	<input type="checkbox"/>
4.2 Develop and implement a communications plan	Project Manager, Project Management Team, Public Relations and Communications Advisor	<input type="checkbox"/>

<b>4.3 Appoint media spokespeople</b>	Project Manager, Project Management Team, Project Steering Committee	<input type="checkbox"/>
<b>4.4 Sign off on agreed communication protocols</b>	Project Manager, Project Management Team, Public Relations and Communications Advisor, Project Sponsor(s)	<input type="checkbox"/>

### Critical Considerations (the “dos” and “don’ts”)

- ✓ *Assume that you will be mis-represented by the media. Try and limit media attention until the data collection is complete.*
- ✓ *Agree in the contract with the sponsor who is responsible for press releases and dissemination of information and results.*
- ✓ *FOTs attract a lot of media attention. Provide adequate time and budget for unsolicited communication with stakeholders, especially with the media.*
- ✓ *Ensure that the project steering committee has input to the communications plan.*
- ✓ *Ensure that there is appropriate control of communication with the media, through the appointed media spokesperson. For EU projects, involving multiple partners, it may be necessary to appoint more than one media spokesperson.*
- ✓ *Everyone involved in the project must know who the media spokesperson is.*
- ✓ *The media spokesperson should consult with the project management group before speaking to the media, especially on sensitive issues.*
- ✓ *Provide media training for appointed spokespeople.*
- ✓ *Build political support for the FOT early in the project, and maintain it during and after the FOT.*
- ✓ *Be aware that there may be some key stakeholders who believe that FOTs are an impediment to system rollout. These people, in particular, must be made aware of the rationale for FOTs.*
- ✓ *Plan to have some results available at early stages of the project. If desirable, they should be released to an informed audience (e.g. at a conference), but not to the media as they could contaminate subsequent data collection.*
- ✓ *Plan for annual public meetings, and a project website, to disseminate information and findings.*
- ✓ *Don't undermine the scientific integrity of the research programme by mis-timing communications with the media and other stakeholders.*
- ✓ *Have a response prepared in case of serious incidents, such as a crash involving a test vehicle. Anticipate media contact between the media and participant drivers.*
- ✓ *Be aware that fleet/truck drivers may be more inclined to disclose opinions to the media if asked.*

<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ <i>Open communication with key stakeholders is important at an early stage of the FOT to ensure that the aims and objectives of the FOT are clear, that stakeholders are committed to the project, and that the aims and objectives of the FOT are not misquoted, misrepresented or misunderstood.</i></li> <li>✓ There should be an agreed minimum level of transparency and result sharing in the FOT – avoid “confidential FOTs”.</li> <li>✓ It may be beneficial to engage a professional press office to handle external communications, particularly with the media.</li> <li>✓ FOT drivers and FOT researchers are usually of most interest to the media.</li> <li>✓ Decide in advance with stakeholders a minimum time for approval for statements released to the media.</li> <li>✓ Be prepared for the possibility that politicians may at times want to veto communications between the FOT project team, the media and other stakeholders.</li> <li>✓ Building political support outside the project can help provide protection against strong partners/sponsors.</li> <li>✓ <i>Early negative media attention may have a significant impact on participant recruitment and/or colour participant expectations of system performance. Try to prevent any media awareness until after the recruitment phase is complete.</i></li> </ul>
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<b>Activity 5: Design the Study</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<p><b>5.1 Become familiar with the methods, measures and procedures of previous FOTs:</b></p> <ul style="list-style-type: none"> <li>○ <b>Read the FESTA handbook</b></li> <li>○ <b>Attend FOT-Net webinars and networking events</b></li> <li>○ <b>Talk to experts who have conducted FOTs previously</b></li> <li>○ <b>Review the relevant literature</b></li> </ul>	Project Manager, Technical Support Team	•
<p><b>5.2 Identify the performance indicators necessary to test the hypotheses derived in Activity 1</b></p>	Project Manager, Research Team, Technical Support Team	•
<p><b>5.3 Select measures (objective and subjective) that allow performance indicators to be derived to test the hypotheses</b></p>	Project Manager, Research Team, Technical Support Team	•

<p><b>5.4 Identify the sensors and sensor requirements for obtaining the required measures</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>5.5 Design the experimental methods, tools and procedures for testing the hypotheses</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>5.6 Define methods, tools, requirements and procedures for acquiring, storing, transferring, de-coding, reducing/transcribing, filtering, backing up and verifying the data</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>5.7 Define methods, tools and procedures for analysing the data</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>5.8 Determine optimal sample size (conduct power analyses) to ensure sufficient statistical power</b></p>	<p>Project Manager, Research Team</p>	<p>•</p>
<p><b>5.9 Select models for estimating the potential safety, environmental and other benefits of the technologies tested</b></p>	<p>Project Manager, Research Team</p>	<p>•</p>
<p><b>5.10 Sign off on study design, methods and tools, questionnaires and associated procedures</b></p>	<p>Project Manager, Project Management Team, Project Steering Committee, Legal and Ethical Advisors, Project Sponsor(s)</p>	<p>•</p>

<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ <i>Ensure that necessary historic data (e.g. data on vehicle speeds on certain roads) is available for baseline comparisons or Cost Benefit Analysis.</i></li> <li>✓ <i>Where relevant, allow sufficient time between vehicle allocations for system maintenance and verification, servicing and repairs to be undertaken.</i></li> <li>✓ <i>Accept that it is impossible to design a perfect FOT. Many practical issues – including time and money – will constrain the final experimental design.</i></li> <li>✓ <i>Remember that an FOT is not an experiment – control is limited, and counterbalancing may not be possible.</i></li> <li>✓ <i>Design into the FOT a contingency plan, in case there is an unexpected requirement to reduce or increase the scope of the study (e.g. to save money or time).</i></li> <li>✓ <i>Employ a multidisciplinary team in developing hypotheses that includes researchers and people with expert knowledge about the systems to be tested.</i></li> <li>✓ <i>Design the study in a way that allows for direct comparisons to be made between objective data (logged by the platform) and participative data (collected through questionnaires, focus groups etc.).</i></li> <li>✓ <i>Keep to an acceptable minimum the number and size of questionnaires that must be completed by participants at different points of the study, to maximise the likelihood of them being completed. A sub-2-hour completion duration is a useful target, as longer sessions may tend to remind participants that they are part of a scientific study.</i></li> </ul>
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- ✓ *Don't be tempted to reduce the sample size in order to save money – conducting a study with too few participants leads to a lack of statistical power to detect effects, and may ultimately be a waste of time and money.*
- ✓ Make sure that everyone understands the FOT study design, so that they appreciate the timing issues and the consequences of wanting to make changes to it, e.g. if wanting to reduce the scope of the study.
- ✓ Delays in one area of the programme cannot necessarily be made up by making sacrifices to other areas.
- ✓ *Don't assume that FOT users are the only ones who will use the FOT platforms.*
- ✓ Don't be pressured into changing the design of the study if, in doing so, it compromises the scientific integrity of the study.
- ✓ *When performing the sample size calculations, allow for participant attrition; e.g. if using fleet drivers, some may leave the company during the FOT period.*
- ✓ Where hypotheses are not supported, consider conducting a process evaluation. This can help determine whether the system did not work, or whether any implementation issues may have impacted on the results. Plan for annual public meetings, and a project website, to disseminate information and findings.

**General Advice**

- ✓ See the FESTA Handbook for detailed advice on designing the research study.
- ✓ See the FESTA Handbook reference list for published reports on previous FOTs.
- ✓ Where it is not possible, for ethical, practical or safety reasons, to investigate an issue in an FOT, consider safe alternative means for doing the research (e.g. simulators, test tracks).
- ✓ *The level of driver familiarity with the test vehicle may influence driver performance during the early stages of the FOT.*
- ✓ Ethical incentives that can be given to discourage driver attrition from the study should be agreed on early in the project.
- ✓ The models for estimating safety and other benefits may need to be updated in response to recent literature when making the estimation.
- ✓ *For the business sector, the commercial impact of the technologies deployed (e.g. in terms of productivity, return on investment, cost savings, incremental revenues by getting more customers, customer loyalty, etc.) will be important to evaluate.*

**Activity 6: Identify and resolve FOT legal and ethical issues**

Tasks and Sub-Tasks	Person/Team/Organisation Responsible for Activity	Done
<b>6.1 Seek specialist advice to identify relevant legal and ethical issues</b>	Project Manager, Accounting/Auditing Advisor, Legal and Ethical Advisors	•
<b>6.2 Resolve all legal and ethical issues that can be identified in advance</b>	Project Manager, Project Management Team, Accounting/Auditing Advisor, Legal and Ethical Advisors	•

<b>6.3 Create contracts and/or agreements with all relevant parties (e.g. vehicle leasing organisations, suppliers, road operators, traffic centres, consultants, fleet managers, researchers etc.) for all relevant issues (e.g. data collection, provision and usage, theft, insurance, privacy, duty of care, property, disposal of vehicles after the study, etc.)</b>	Project Manager, Project Management Team, Accounting/Auditing Advisor, Legal and Ethical Advisors	•
<b>6.4 Seek approvals to conduct the study and store and possibly share test data from relevant ethics and privacy committees</b>	Project Manager, Research Team, Technical Support Team, Legal and Ethical Advisors	•
<b>6.5 Seek expert advice regarding liability issues and to ensure insurance provision is adequate for all foreseeable eventualities</b>	Project Manager, Accounting/Auditing Advisor, Legal and Ethical Advisors	•
<b>6.6 Ensure that vehicle type approval and warranty requirements are adhered to in spite of the modifications (implementation of data logging equipment and possibly systems to be evaluated, etc.)</b>	Project Manager, Research Team, Legal and Ethical Advisors	•
<b>6.7 Obtain informed consent of participants before they are allowed to participate in the FOT</b>	Project Manager, Research Team, Technical Support Team	•
<b>6.8 Sign off on all aspects of the FOT design and procedures pertaining to legal and ethical matters</b>	Project Manager, Project Management Team, Accounting/Auditing Advisor, Legal and Ethical Advisors, Project Sponsor(s)	•

### Critical Considerations (the “dos” and “don’ts”)

- ✓ In terms of the project timeline, legal and ethical issues need to be considered in parallel from beginning to end (and indeed afterwards in terms of data protection), especially if the data is planned to be re-used in new projects.
- ✓ *There must be mutual agreement on the relative risks to all parties before contracts are signed.*
- ✓ *Double-check that the final design and conduct of the FOT accords with ethical and legal requirements in all jurisdictions in which the FOT will physically occur.*
- ✓ Ensure that all intellectual property issues are identified and resolved “up front”.
- ✓ Ensure permission to drive (and necessary insurance cover) restrictions are understood by all parties, particularly participants.
- ✓ Identify the conditions under which a participant will be expelled from the study, and ensure these are made known to participants before the FOT commences.
- ✓ Ensure that all participating drivers are fully licensed to drive the test vehicles.
- ✓ *Don't forget about the need to adhere to contractual obligations and confidentiality agreements. FOTs often extend over long periods, making it easy to lose sight of obligations and agreements.*

<ul style="list-style-type: none"> <li>✓ Clarify participant responsibilities and the study's obligations to the participants. Participant responsibilities should include routine vehicle maintenance activities, e.g. checking fluid levels.</li> <li>✓ <i>Ensure all relevant health and safety requirements of participants and the study team are met.</i></li> <li>✓ All project staff must understand who has access to project data, especially video data. If personal data is to be passed on to third parties, it needs to be anonymised (Note: with GPS and video data it may be very difficult to guarantee anonymity).</li> <li>✓ <i>All study team members must understand the agreed response should a major incident, such as an accident, occur. Any media comment should only be made by the spokesperson.</i></li> <li>✓ Don't underestimate the complexity and time commitment involved in identifying and resolving the legal and ethical issues associated with the conduct of an FOT.</li> <li>✓ <i>Ensure that all methods, tools, procedures and materials used in the study that require legal and ethics approval are approved by the Ethics Committee at appropriate points in the study.</i></li> </ul>
<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ See <a href="#">Chapter 3</a> of this FESTA Handbook for detailed advice on legal and ethical issues.</li> </ul>

<b>Activity 7: Select and obtain FOT test platforms (vehicles, mobile devices, road side units, ...)</b>		
Tasks and Sub-Tasks	Person/Team/Organisation Responsible for Activity	Done
<b>7.1 Specify functional requirements, performance specifications and user requirements for the test platforms needed for the study</b>	Project Manager, Research Team, Technical Support Team	•
<b>7.2 Specify functional requirements and performance specifications for the integration into platforms of all systems needed for the FOT (FOT technologies, support technologies and data collection technologies), if these are not already in the platforms</b>	Project Manager, Research Team, Technical Support Team	•
<b>7.3 Select test platforms (makes and models) that meet the above requirements</b>	Project Manager, Technical Support Team	•
<b>7.4 Where relevant, purchase, lease, hire or borrow (where the driver owns the vehicle) the test vehicles and/or platforms</b>	Project Manager, Accounting/Auditing Advisor	•
<b>7.5 Sign off on selection and obtaining of test platforms</b>	Project Manager, Technical Support Team, Project Management Team, Project Sponsor(s)	•

**Critical Considerations (the “dos” and “don’ts”)**

- ✓ The choice of platforms may well impinge on the selection of participants which, in itself, will impact on the research questions. Choice of platforms must be undertaken at an early stage in the project’s planning.
- ✓ *Consider obtaining extra test platforms. These can be used as spare items in case of failure and as “showcasing” platforms. The latter can be driven at appropriate times by politicians and other high ranking officials in positions of authority to promote and deploy the systems on a wider scale.*
- ✓ Be aware that vehicle choice may affect participant response if the test vehicle is significantly better/worse than the vehicle they are used to driving. Choose a conservative model.
- ✓ *Do consider vehicle maintenance requirements and the dealer network that is available in the FOT area. If the FOT will take place in a limited area, consider advising the local dealer(s) of the study. This may be important if a participant takes a test vehicle to a dealer to fix a problem.*

**General Advice**

- ✓ Where used, the test vehicle will vary, depending on the nature of the FOT. In some FOTs, the test vehicles will already contain mature OEM systems. In others, the systems will need to be developed (fully or partly) and integrated into the vehicles. In some FOTs, the systems will be integrated into drivers’ own vehicles; in others, they will be integrated into company fleet vehicles.
- ✓ The test platforms must be capable of hosting the technologies to be evaluated (OEM, aftermarket and nomadic) and the data logging and support systems.
- ✓ Carefully evaluate the trade-off between owned and leased equipments and vehicles to be used in FOTs in order to choose the most convenient solution for the specific responsible organisation.

**Activity 8: Select and obtain systems and functions to be evaluated during the FOT (if they are not already implemented in the test platforms)**

Tasks and Sub-Tasks	Person/Team/Organisation Responsible for Activity	Done
<p><b>8.1 Develop selection criteria for choosing systems and functions (OEM, aftermarket and nomadic) to be tested (if the technologies to be tested have not already been selected by the sponsor; see General Advice column)</b></p>	<p>Project Manager, Research Team, Technical Support Team, Project Steering Committee</p>	<p>•</p>
<p><b>8.2 Use the above selection criteria to select and obtain systems to be tested</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>

<p><b>8.3 If commercial systems do not exist that meet the above criteria, develop functional requirements and performance specifications for systems that do (including for HMI and security issues)</b></p>	<p>Project Manager, Research Team, Technical Support Team and (if appropriate) consultant</p>	<p>•</p>
<p><b>8.4 Develop functional requirements and performance specifications for the infrastructure needed to support deployment of the technologies to be tested (e.g. digital maps, roadside units)</b></p>	<p>Project Manager, Research Team, Technical Support Team, Project Steering Committee, and (if appropriate) Consultant</p>	<p>•</p>
<p><b>8.5 Source infrastructure that meets the above functional requirements and specifications</b></p>	<p>Project Manager, Technical Support Team and (if appropriate) Consultant</p>	<p>•</p>
<p><b>8.6 Where infrastructure is not commercially available, develop supporting infrastructure that meets the above functional requirements and performance specifications</b></p>	<p>Project Manager, Research Team, Technical Support Team and (if appropriate) Consultant</p>	<p>•</p>
<p><b>8.7 If appropriate, issue Expressions of Interest/Requests for Tenders for provision of systems and supporting infrastructure</b></p>	<p>Project Manager, Project Management Team, Accounting/Auditing Advisor, Legal and Ethical Advisors</p>	<p>•</p>
<p><b>8.8 If appropriate select preferred tenderers, negotiate contracts and award contracts</b></p>	<p>Project Manager, Project Management Team, Accounting/Auditing Advisor</p>	<p>•</p>
<p><b>8.9 Decide what will be done with the test platforms, and the equipment in them, once the FOT has been completed</b></p>	<p>Project Manager, Research Team, Technical Support Team, Administrative Support Team, Project Steering Committee, Legal and Ethical Advisors, Project Sponsor(s)</p>	<p>•</p>
<p><b>8.10 Sign off on selection and obtaining of systems and functions to be evaluated during the FOT</b></p>	<p>Project Manager, Technical Support Team, Project Management Team, Project Sponsor(s)</p>	<p>•</p>

<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ Do ensure that criteria for the selection of candidate systems (where this is appropriate) to be evaluated are developed in consultation with relevant stakeholders, in order to ensure that the systems to be tested meet the needs of all relevant stakeholders and are suitable for in-car use (this includes good interface design).</li> <li>✓ Selection of systems must be undertaken with consideration of the data-logging system. If not, problems of interfacing may result. Ensure that data sharing and re-use are described in contracts.</li> <li>✓ Beware of hidden costs of hardware and software development if these items are not originally designed for research purposes.</li> </ul>
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**General Advice**

- ✓ Criteria for selection of candidate systems in the FOT (if they have not been pre-selected by the sponsor) could include: likely safety or environmental benefit, likely benefit in increasing commercial productivity and efficiency, availability, compatibility with host vehicles, technical performance, cost, reliability, maintainability, likely acceptability to drivers, usability, compliance with relevant human factors/ergonomic guidelines, compliance with local legal requirements, compliance with relevant standards, crashworthiness etc.
- ✓ If prototype systems are tested, then estimates of durability, reliability, maintenance costs etc. of production systems will be difficult, and full Cost Benefit Analyses may not be possible.

**Activity 9: Select and obtain data collection and transfer systems**

Tasks and Sub-Tasks	Person/Team/Organisation Responsible for Activity	Done
<b>9.1 Specify data to be logged (measures and sampling rate)</b>	Project Manager, Research Team, Technical Support Team	•
<b>9.2 Specify functional requirements and performance specifications for systems for collecting and transferring the data to be logged</b>	Project Manager, Research Team, Technical Support Team	•
<b>9.3 Source, purchase and/or develop systems for logging and transferring the data that meet the above functional requirements and performance specifications</b>	Project Manager, Technical Support Team and (if appropriate) Sub-Contractors	•
<b>9.4 Sign off on selection and obtaining of data collection and transfer system</b>	Project Manager, Project Management Team, Legal and Ethical Advisors, Project Sponsor(s)	•

**Critical Considerations (the “dos” and “don’ts”)**

- ✓ Implement re-calibration procedures that will ensure accuracy of measurements/sensors over time and help prevent data drift issues.
- ✓ Plan for software upgrade and revision during the FOT and try to ensure that all software systems are updated together. Ideally, this should be possible remotely.
- ✓ Where used, in-vehicle data logging systems need to be unobtrusive, safe and secure – but they also need to be accessible to enable routine repairs.
- ✓ Where relevant, provide a location close to the participants for vehicle support.
- ✓ Data logging systems should offer continuous monitoring capabilities.
- ✓ Minimise user involvement in data download from test platforms.

<ul style="list-style-type: none"> <li>✓ Ensure boot-up time for test systems and data logging systems is sufficiently fast to prevent data loss at the beginning of each trip.</li> <li>✓ Ensure that a common timestamp is used for all recorded data sources.</li> <li>✓ Verify the definition of signals provided by 3<sup>rd</sup> parties (e.g. CAN message definitions by vehicle manufacturers)</li> <li>✓ Do not allow data collection to proceed automatically without active confirmation of data capture and validity. This may include the generation of warning messages when out-of-tolerance data is recorded.</li> <li>✓ Recognise that some data is much more important than others and should be given a relatively higher priority.</li> <li>✓ Do keep a stock of spares for critical items, and anticipate that some components may become unobtainable during the study.</li> <li>✓ Consider the opportunities for ad-hoc and post-hoc interrogation of raw data files to answer additional questions. This may not be possible if data collection is triggered.</li> </ul>
<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ The technologies fitted to test vehicles may also include supplementary technologies (such as sensor technologies; e.g. forward looking radars, GPS) that are needed e.g. to measure inter-vehicle following distances in order to determine whether speeds are free or constrained.</li> <li>✓ See <a href="#">Chapter 3</a> of the FESTA Handbook on legal issues of data privacy to be aware of possible dangers and legal provisions.</li> </ul>

<b>Activity 10: Select and obtain support systems for FOT platforms</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>10.1 Define the support systems needed (see General Advice column)</b>	Project Manager, Research Team, Technical Support Team and (if appropriate) Consultant	•
<b>10.2 Develop functional requirements and performance specifications for systems needed to support the study</b>	Project Manager, Research Team, Technical Support Team and (if appropriate) Consultant	•
<b>10.3 Where appropriate, develop functional requirements and performance specifications for the HMI, to ensure that the HMI for support systems is safe and user-friendly</b>	Project Manager, Research Team, Technical Support Team and (if appropriate) Consultant	•
<b>10.4 Source, purchase and/or develop support systems that meet the above functional requirements and performance specifications</b>	Project Manager, Technical Support Team and (if appropriate) Sub-Contractors	•

<p><b>10.5 Sign off on selection and obtaining of support systems for test platforms</b></p>	<p>Project Manager, Project Management Team, Project Sponsor(s)</p>	<p>•</p>
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<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ If possible, support systems should be capable of remote operation to allow e.g. remote system reboot.</li> <li>✓ In the case of very large naturalistic studies it may not be practicable to intervene manually. In these cases do attempt to automate as much as possible.</li> <li>✓ Anticipate data analysis requirements before specifying data to be logged (e.g. rates and resolution).</li> <li>✓ Ensure that missing data are clearly indicated – e.g. if the data collection system malfunctions, missing data should NOT be indicated with a zero, where zero is a valid measure (e.g. speed).</li> <li>✓ If in doubt about the final list of measures to be logged, log more parameters if performance of the data logging system or storage capacity are not affected. Consider the opportunities for ad-hoc and post-hoc interrogation of raw data files to answer additional questions. This may not be possible if data collection is triggered.</li> </ul>
<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ Support systems have multiple purposes: e.g. to display information to users; to automatically turn systems on and off where multiple systems are being tested and exposure to each is kept constant across drivers; for manually disabling systems in the event of malfunctions (i.e. “panic buttons”); for preventing use of systems by non-participants; for diagnosing system status and faults; etc.</li> </ul>

<p><b>Activity 11: Equip FOT test platforms with all systems</b></p>		
<p><b>Tasks and Sub-Tasks</b></p>	<p><b>Person/Team/Organisation Responsible for Activity</b></p>	<p><b>Done</b></p>
<p><b>11.1 Prepare a system installation/integration manual describing standardised procedures</b></p>	<p>Project Manager, Technical Support Team and (if appropriate) Sub-Contractors</p>	<p>•</p>
<p><b>11.2 Equip test platforms with the FOT systems to be evaluated (if not already installed)</b></p>	<p>Project Manager, Technical Support Team and (if appropriate) Sub-Contractors</p>	<p>•</p>
<p><b>11.3 Equip test platforms with data collection and transfer systems</b></p>	<p>Project Manager, Technical Support Team and (if appropriate) Sub-Contractors</p>	<p>•</p>

<p><b>11.4 Equip platforms with FOT support systems (e.g. panic button, for turning systems off in a vehicle etc.)</b></p>	<p>Project Manager, Technical Support Team and (if appropriate) Sub-Contractors</p>	<p>•</p>
<p><b>11.5 Sign off on system integration activities, ensuring that all systems have been installed in accordance with the system installation/integration manual</b></p>	<p>Project Manager, Project Management Team, Project Sponsor(s)</p>	<p>•</p>

<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ Ensure that the computers running all systems (FOT, data collection and support) have sufficient computing power to avoid processing delays.</li> <li>✓ <i>Ensure that all systems (FOT, data collection and support) operate identically across test platforms.</i></li> <li>✓ <i>Allow all new vehicles a burn-in period (around 1000km) so that vehicle faults, that could disrupt the FOT, can be detected.</i></li> <li>✓ Be aware that ‘identical’ platforms and sensors may perform differently due to variation in components, manufacturing variability and environmental conditions. Check for differences that may be critical for the FOT.</li> <li>✓ Try and make all adaptations to test vehicles (e.g. fitment of novel display systems) invisible to reduce the likelihood of theft or behaviour modification by other drivers.</li> </ul>
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<p><b>Activity 12: Design and implement user feedback and reporting systems</b></p>		
<p><b>Tasks and Sub-Tasks</b></p>	<p><b>Person/Team/Organisation Responsible for Activity</b></p>	<p><b>Done</b></p>
<p><b>12.1 Design, develop and implement systems and procedures to allow users to report technical problems in a timely manner</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>12.2 Design, develop and implement systems and procedures to allow users to provide feedback to researchers, in real time or retrospectively (e.g. usability problems, opinions of systems, confirmation that systems are operating as required etc.)</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>12.3 Design, develop and implement systems and procedures that allow researchers to monitor participant progress (e.g. to ensure they are adhering to study requirements)</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>

<p><b>12.4 Sign off on implementation of user feedback and reporting systems and procedures</b></p>	<p>Project Manager, Research Team, Technical Support Team, Project Management Team, Project Sponsor(s)</p>	<p>•</p>
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<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ Implement ‘user diaries’ to allow confirmation of user identity and trip details if this process cannot be automated. This may encourage users to behave less naturally.</li> <li>✓ Implement a timetable for the timely collection of qualitative data so that participants don’t have to rely on their memories.</li> <li>✓ Implement a timetable for periodic verification of collected log data and checking that systems/cars still operate correctly.</li> <li>✓ <i>Anticipate that users may not complete diaries accurately or consistently and may fail to attend de-briefing interviews. Appoint user liaison staff as a single point of contact.</i></li> <li>✓ <i>Ensure that the project team can respond to emergencies and incidents on a 24/7 basis.</i></li> <li>✓ Do ask participants to announce when they are going on holiday or not using the platform for an extended period.</li> <li>✓ Keep a record of all reported problems, and document these in relevant reports.</li> <li>✓ Ensure that all feedback and reporting procedures are documented in a manual for quick reference by the research and technical support team as required.</li> <li>✓ Consider whether you need to design, develop and implement a system to allow for the collection of fuel consumption information.</li> <li>✓ Where fuel consumption is calculated manually, anticipate that drivers will not always use fuel cards, return fuel docketts or fill in the fuel logbook.</li> </ul>
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<p><b>Activity 13: Select, obtain and implement standard relational database for storing FOT data</b></p>		
<p><b>Tasks and Sub-Tasks</b></p>	<p><b>Person/Team/Organisation Responsible for Activity</b></p>	<p><b>Done</b></p>
<p><b>13.1 Design, develop and implement a database for storing data logged from the test platforms</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>13.2 Design, develop and implement a database for storing the subjective data collected from participants (e.g. from questionnaires, focus groups, feedback lines etc.)</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>13.3 Develop data navigation and visualisation tools</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>

<p><b>13.4 Sign off on database for storing FOT data</b></p>	<p>Project Manager, Research Team, Technical Support Team, Project Management Team, Legal and Ethical Advisors, Project Sponsor(s)</p>	<p>•</p>
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<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ It is recommended to create a Data Management Plan describing the data management processes and e.g. access rights to the data.</li> <li>✓ Before an FOT is launched, the database architecture should be reviewed by a system evaluator to ensure that all requirements are fulfilled.</li> <li>✓ <i>Ensure copies are made of raw data, reduced raw data and all processed data files and store these securely, separate from the primary data store.</i></li> <li>✓ Ensure that raw and processed data items are well documented.</li> <li>✓ Use an industry standard relational database to store the data.</li> <li>✓ <i>Ensure that unauthorised access to the database is not possible. Preferably, do not give the database host an IP number.</i></li> <li>✓ Careful database design can reduce the need for post-collection manipulation if the database is designed to feed directly into a statistical package for data cleaning and analysis.</li> <li>✓ <i>Decide early in the project how to manage post-project data. Issues to consider are: What happens to data when the project ends? Who will have data usage rights? Who can access it? Who pays for possible storage? In projects with large amounts of stored data (several terabytes), the cost to store and manage data is not insignificant, and all project partners might not have the means to handle it afterwards. Where data is taken off-line, determine what metadata should be kept, and how.</i></li> </ul> <p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ Basic legal advice on this issue is also provided in <a href="#">Chapter 3</a> of the FESTA handbook.</li> </ul>
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<p><b>Activity 14: Test all systems against functional requirements and performance specifications</b></p>		
<p><b>Tasks and Sub-Tasks</b></p>	<p><b>Person/Team/Organisation Responsible for Activity</b></p>	<p><b>Done</b></p>
<p><b>14.1 Develop “acceptance testing” protocols (see comment column)</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>14.2 Test the systems for acceptance, using the acceptance testing protocol</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>14.3 Develop a usability test plan for the purpose of assessing the systems and functions for usability</b></p>	<p>Project Manager, Research Team with consultant (if appropriate)</p>	<p>•</p>

<p><b>14.4 Conduct usability testing, using the usability testing plan, to ensure systems and functions are user-friendly and that they meet all usability assessment criteria</b></p>	<p>Project Manager, Research Team, with consultant (if appropriate)</p>	<p>•</p>
<p><b>14.5 Obtain or develop a valid and reliable ergonomic checklist</b></p>	<p>Project Manager, Research Team</p>	<p>•</p>
<p><b>14.6 Assess systems, using the ergonomic checklist, to ensure that they meet all relevant criteria</b></p>	<p>Project Manager, Research Team</p>	<p>•</p>
<p><b>14.7 Assess vehicles against relevant certification procedures to ensure that vehicles are safe, roadworthy and comply with all relevant National, State and Territory laws, treaties and other protocols</b></p>	<p>Project Manager, Technical Support Team with Consultant (if appropriate)</p>	<p>•</p>
<p><b>14.8 Ensure that all vehicle modifications that affect primary safety are signed off by a competent engineer or appropriate testing authority</b></p>	<p>Project Manager, Technical Support Team with Consultant (if appropriate)</p>	<p>•</p>
<p><b>14.9 Rectify all technical, usability, ergonomic and certification issues where deficiencies are noted</b></p>	<p>Project Manager, Research Team, Technical Support Team with Consultant (if appropriate)</p>	<p>•</p>
<p><b>14.10 Sign off on completion of all systems tests</b></p>	<p>Project Manager, Research Team, Technical Support Team, Project Management Team, Project Sponsor(s)</p>	<p>•</p>

<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ <i>Do not sign off on the outputs of any of the previous activities until all technologies have been tested and, where appropriate, refined.</i></li> <li>✓ <i>Be sure that all systems are designed so they do not drain the battery when the engine is not running.</i></li> <li>✓ <i>Be sure that retrofitted systems are properly secured and meet all relevant crashworthiness requirements.</i></li> <li>✓ <i>If sub-contractors are appointed to install or maintain test equipment, implement a quality assurance programme.</i></li> <li>✓ <i>Be aware that system clocks can drift significantly if left to run independently. Where feasible, use GPS time to correct system clock error.</i></li> <li>✓ <i>Implement procedures to ensure that alignment and calibration of sensors is maintained and tested in all potential weather conditions.</i></li> <li>✓ <i>Various guidelines, standards and checklists exist for assessing the ergonomic quality of the human-machine interface for ICT systems</i></li> <li>✓ <i>Be aware that some system components may become corrupted over time with continuous use (e.g. flash memory cards).</i></li> <li>✓ <i>Revisit the installation manual for all platforms.</i></li> </ul>
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<ul style="list-style-type: none"> <li>✓ Consider the need to obtain waivers/special licences from regulatory authorities for equipment that is non-compliant (e.g. radars that operate outside legal bandwidths).</li> <li>✓ Standard testing of vehicle modifications by a competent authority may be necessary with respect to safety features (e.g. proper deployment of airbags following modification to vehicle interiors).</li> <li>✓ <i>Be aware that some systems (e.g. displays) that are not OEM-installed may fail in automotive environments.</i></li> <li>✓ <i>Where appropriate, test for radio frequency (RF) interference effects (e.g. from overhead tram wires), which may adversely affect system operation. Also ensure that normal vehicle systems (e.g. FM radio and remote locking) are not affected by installed equipment.</i></li> <li>✓ Ensure that the computers powering the data collection system and support systems are powerful enough to ensure that the data sampling rate is consistent and at the rate specified.</li> <li>✓ Don't assume that OEM systems that are already installed in test vehicles have been ergonomically assessed against appropriate standards and guidelines. Ergonomic assessment of systems prior to system deployment can be useful in identifying ergonomic problems that may explain or confound treatment effects.</li> <li>✓ <i>Resolving any technical, usability, ergonomic, and certification issues may require several iterations. Do not underestimate the time required for this process.</i></li> </ul>
<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ This activity is <i>not</i> about pilot testing – it is about testing the performance, security and reliability of systems – to ensure that all technologies to be deployed perform in accordance with the functional requirements and performance specifications developed for them in previous activities.</li> <li>✓ An Acceptance testing Protocol is a test protocol for testing that all systems to be used in the study (FOT systems, data collection systems and support systems) meet the functional requirements and performance specifications developed for them by the FOT project team, under all foreseeable operating conditions.</li> <li>✓ The term “usability” can mean different things to different people. The test plan should use a standard definition of usability (e.g. ISO 9241).</li> <li>✓ Be aware that the frequency used by some radar-based systems may interfere with the operation of other systems used by police, emergency services or other operators (or vice versa) when used in other countries or jurisdictions. This must be investigated where the FOT is conducted across State and international boundaries.</li> </ul>

<b>Activity 15: Develop FOT recruitment strategy and materials</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>15.1 Develop a recruitment strategy, including user entry and exit requirements and procedures</b>	Project Manager, Research Team, Legal and Ethical Advisors	•
<b>15.2 Develop recruitment materials and procedures</b>	Project Manager, Research Team, Public Relations and Communications Advisor	•

15.3 Sign off on recruitment strategy, materials and procedures	Project Manager, Research Team, Project Management Team	•
<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ Consider whether participants should be representative of the relevant population to ensure generalisability of results.</li> <li>✓ Assume that there will be an attrition rate of about 10 to 15% when using company employees, who come and go, and retire.</li> <li>✓ Be aware that, when company employees change jobs within their companies, this may have a dramatic effect on their annual travel.</li> <li>✓ If fleet drivers are recruited via a fleet owner or manager, it is also necessary to get buy-in from individual drivers.</li> <li>✓ With respect to safety, select drivers who do not pose a risk to themselves, others or the project. Be aware of the potential for bias in the results.</li> <li>✓ Do not underestimate the complexities involved in recruiting company employees.</li> <li>✓ Be aware that some commercial operations may have employee turnover rates approaching 100% per annum.</li> </ul> <p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ <i>The ethical requirements for recruitment of users may be difficult to adhere to when recruiting company employees.</i></li> <li>✓ Ideal companies to approach to recruit fleet vehicle drivers have the following characteristics: many vehicles; drivers have high mileage rates; drivers drive primarily in the geographical areas of interest in the FOT; and management has a commitment to the aims and objectives of the FOT.</li> <li>✓ It is not possible in many countries to obtain personal information about drivers that can be used to screen them for inclusion in the study (e.g. has a drunk driving record).</li> <li>✓ It may not be possible in some countries to obtain directly from car dealers the names of drivers of particular makes and models of vehicles.</li> <li>✓ In some countries (e.g. France), potential participants must be screened by a registered doctor.</li> <li>✓ <i>The recruitment materials and procedures will need to have been incorporated and approved as part of the FOT ethics and legal approval processes.</i></li> </ul>		

<b>Activity 16: Develop training and briefing materials</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>16.1 Conduct training needs analysis (TNA) to identify training requirements of participants and other relevant actors</b>	Project Manager, Research Team with Consultant (if appropriate)	•
<b>16.2 Design and develop briefing and training materials, based on outputs of the TNA</b>	Project Manager, Research Team with Consultant (if appropriate)	•
<b>16.3 Design and develop an FOT system(s) user manual (if appropriate)</b>	Project Manager, Research Team, Legal and Ethical Advisors	•
<b>16.4 Design and document the procedures for delivery of the briefing and training to the FOT participants</b>	Project Manager, Research Team	•
<b>16.5 Sign off on training and driver (and company) briefing materials and delivery processes</b>	Project Manager, Research Team, Project Management Team	•

### **Critical Considerations (the “dos” and “don’ts”)**

- ✓ *Ensure that training programmes and briefing materials are designed in a way that does not confound experimental treatment effects.*
- ✓ Ensure all users understand all existing systems and functions to be used (including test systems).
- ✓ Don't underestimate the time required for the development of briefing and training materials – it is a time-consuming activity.
- ✓ When pre-testing the user-friendliness of a function a self-learning approach may be used.
- ✓ Be aware that an excess of training might affect the possibility to understand the short-term unintended effects of the system.
- ✓ Provide drivers with a mini operating manual to keep in the vehicle and prepare written materials (brochures, DVDs & CDs) that can be taken away after briefing sessions.
- ✓ Provide a written statement for the participants to keep (in the vehicle) which confirms their participation in the FOT and the nature of vehicle modifications – in case they are challenged by police or other authorities.

### **General Advice**

- ✓ Look for examples of training and briefing materials used in a previous FOTs.
- ✓ *Refresher training may be required if FOT systems are not activated for several weeks or months into the FOT.*

✓ The training and briefing materials and procedures will need to have been incorporated and approved as part of the FOT ethics and legal approval processes.

<b>Activity 17: Pilot test FOT equipment, methods and procedures</b>		
Tasks and Sub-Tasks	Person/Team/Organisation Responsible for Activity	Done
<b>17.1 Develop a protocol for pilot testing FOT equipment, methods, procedures, evaluation tools and materials (including training, briefing materials and data collection, downloading and analysis procedures)</b>	Project Manager, Research Team, Technical Support Team, Legal and Ethical Advisors	•
<b>17.2 Recruit, brief and train pilot participants</b>	Project Manager, Research Team	•
<b>17.3 Deploy a small sample of FOT platforms under a representative range of external conditions that will be experienced in the FOT, as per the pilot testing protocol</b>	Project Manager, Research Team, Technical Support Team	•
<b>17.4 Fine tune FOT platforms and technologies, systems, procedures, evaluation tools and protocols, as required, on the basis of the pilot data yielded</b>	Project Manager, Research Team, Technical Support Team, Project Management Team	•
<b>17.5 Sign off on pilot testing (green light for starting the main tests)</b>	Project Manager, Research Team, Technical Support Team, Project Management Team	•

**Critical Considerations (the “dos” and “don’ts”)**

- ✓ *Do not truncate your pilot test plan, and do not underestimate the time required for comprehensive pilot testing. The importance of pilot testing cannot be overstated.*
- ✓ Undertake a ‘full dress rehearsal’ with participant involvement and a duration that is representative of the duration that will occur in the FOT.
- ✓ Use pilot testing also as a means of estimating the amount of time required to complete activities, as this will enable more accurate budgeting during the remainder of the project.
- ✓ Pre-test all data analysis procedures to ensure appropriate data is collected – particularly data related to event recording triggers.
- ✓ Ensure that the routes used in pilot studies maximise the likelihood of critical situations of relevance to the FOT. Consider using a test track to verify the logging of critical situations.

<ul style="list-style-type: none"> <li>✓ Add independent monitoring systems to pilot platforms to ensure the validity of data derived from sensors.</li> <li>✓ <i>In the pilot phase listen to the users and, when involved, owners and managers of the vehicle fleet – their ideas are likely to be different.</i></li> </ul>
<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ For data collection systems, ensure that data is being recorded, determine the accuracy of data recorded, test downloading procedures and equipment, test reader software and analyse samples of pilot data.</li> </ul>

<b>Activity 18: Run the FOT</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>18.1 Ensure that all sign-offs have occurred for previous activities</b>	Project Manager, Project Management Team	•
<b>18.2 Manage the FOT:</b> <ul style="list-style-type: none"> <li>○ Monitor project activities, timelines, budgets and resources</li> <li>○ Prepare regular progress and financial reports for sponsor</li> <li>○ Convene and attend regular meetings with research and support teams</li> <li>○ Maintain communication with sponsor and key stakeholders</li> </ul>	Project Manager, Research Team, Technical Support Team, Administrative Support Team, Project Management Team	•
<b>18.3 Recruit participants</b>	Project Manager, Research Team	•
<b>18.4 Organise training session times/materials</b>	Project Manager, Research Team	•
<b>18.5 Brief and train participants</b>	Project Manager, Research Team	•
<b>18.6 Brief fleet managers (if appropriate)</b>	Project Manager, Research Team	•
<b>18.7 Deploy FOT platforms</b>	Project Manager, Research Team, Technical Support Team	•
<b>18.8 Regularly monitor participant progress, including kilometres travelled</b>	Project Manager, Research Team	•

<b>18.9 Administer questionnaires and implement other data collection methods at pre-determined intervals</b>	Project Manager, Research Team	•
<b>18.10 Collect, enter into database (unless automated) and store subjective data</b>	Project Manager, Research Team	•
<b>18.11 Record, download and store objective (i.e. logged) data</b>	Project Manager, Research Team, Technical Support Team	•
<b>18.12 Collect special data (e.g. fuel docketts) needed to analyse surrogate performance indicators</b>	Project Manager, Research Team	•
<b>18.13 Monitor for, collect and document data on technical problems and user feedback</b>	Project Manager, Research Team, Technical Support Team	•
<b>18.14 Commence preliminary evaluation of data, to identify instances of dangerous driving and any other findings of interest/relevance to FOT outcomes</b>	Project Manager, Research Team, Technical Support Team	•
<b>18.15 Repair and re-deploy platforms (as required)</b>	Project Manager, Technical Support Team	•
<b>18.16 Routinely ensure all platforms are properly maintained and legal in other ways (e.g. registered, licensed, tyres properly inflated)</b>	Project Manager, Research Team, Technical Support Team	•
<b>18.17 Report dangerous driving behaviours (if legally required)</b>	Project Manager, Research Team, Technical Support Team	•
<b>18.18 Conduct exit interviews with users and the other relevant actors</b>	Project Manager, Research Team	•
<b>18.19 Remove systems and equipment from private vehicles (if used)</b>	Project Manager, Technical Support Team	•
<b>18.20 Sign off on completion of this activity of the FOT</b>	Project Manager, Research Team, Technical Support Team, Administrative Support Team, Project Steering Committee, Project Management Team, Accounting/Auditing Advisor, Sub-Contractors	•

### **Critical Considerations (the “dos” and “don’ts”)**

- ✓ Anticipate, and plan for, participant ‘dropout’ throughout the FOT – over-sample. It is rarely possible to replace participants who drop out after more than a few days without affecting the timing plan.

- ✓ *Develop protocols for responding to drivers with technical and other problems (e.g. provide drivers with a dedicated cell phone to report problems; ensure at least two people have pagers to receive problem calls; etc.) Timely responses will keep drivers happy.*
- ✓ Anticipate problems that may increase the drop-out rate (e.g. higher fuel consumption in the FOT vehicle than in the driver's own vehicle) and take steps to prevent or mitigate these problems.
- ✓ Monitor closely system usage for drivers who may be tempted to 'demonstrate' novel systems to friends and neighbours.
- ✓ Adhere to quality control mechanisms to ensure that data is being properly recorded and downloaded.
- ✓ Adhere to calibration procedures to ensure accuracy of measurements/sensors over time and help prevent data drift issues.
- ✓ Find a suitable location for training drivers where you can also assess transfer of training to the test vehicles in a safe environment
- ✓ *If the number of kilometres driven by drivers is being controlled for, conduct regular calibration checks of cumulative distance travelled.*
- ✓ Assume that it will take you 50% longer than you think to recruit participants if recruiting company drivers.
- ✓ Check logged data as soon as you receive it to verify accuracy and completeness of data and verify kilometres travelled.
- ✓ *Monitor and record critical factors that could have an impact on the measured outcomes/dependent variables (e.g. changes in police enforcement strategies, unseasonal weather conditions). If these are not controlled for in the experimental design, or accounted for in the analyses, they could confound the measured effects of the systems being tested.*
- ✓ Where company fleet vehicles are involved in the study, advise fleet managers not to "demonstrate" their vehicles, as this may compromise the aims of the study.
- ✓ *Give sponsors early warning of potential problems that could compromise the integrity of the study, or increase the budget.*
- ✓ Encourage participants to report technical problems as soon as possible.
- ✓ *Don't assume that all systems in the test vehicles are functioning as required. Develop systems to check, at appropriate times, that they are operating properly.*
- ✓ Don't assume that drivers will do what you ask them to do (e.g. fill out questionnaires; maintain vehicles). They need regular reminding and follow-up.
- ✓ Where data downloading is manual, don't forget to replace flash memory cards, or other storage devices, with new (empty) ones on a regular basis.
- ✓ Do not always assume that drivers will clock up their kilometres evenly over the trial. Contact them on a regular basis to check cumulative distance logged.
- ✓ If legally required, don't forget to report to the appropriate authorities (e.g. company fleet managers) recorded instances of dangerous driving by test drivers.
- ✓ *Don't assume that drivers will drive the vehicles without trailers, bike racks and other accessories. These may affect the operation of some FOT systems (e.g. reverse collision warning devices).*
- ✓ Minimise interference to commercial operations during FOTS, especially trucking operations. Problems that compromise commercial productivity may result in companies withdrawing trucks from the FOT.
- ✓ *Make sure fleet managers are, and remain, motivated. Their support is critical.*
- ✓ Be careful about the feedback given to drivers. They may be concerned about the possibilities of 'unintended consequences', e.g. their managers learning how and when they take rest breaks etc.

- ✓ Participants are more likely to comply with what is asked of them if they engage with the project. Ongoing communication and even small incentives can enhance perceived engagement and improve compliance. However, the level of engagement must not compromise the outcomes of the study.
- ✓ Remember that long-term involvement in a research study can be onerous for a participant. At all times treat them as participants in the study process, not simply subjects of a study.
- ✓ Allow sufficient time for any data entry which has to be done manually (e.g. responses from pencil and paper questionnaires, focus groups). As far as is possible, manual data entry should be carried out routinely during the course of the data collection phase and not all left to the end.
- ✓ A system for basic inventory management is recommended for FOTs with more than a few vehicles in use. For such a system to be efficient, sensors, data acquisition system units, vehicles and all other equipment need to be included, as well as relevant supporting procedures developed.

#### General Advice

- ✓ Ongoing communication with key stakeholders is important during the FOT to ensure that the aims and objectives of the FOT are clear, that stakeholders stay committed to the project, and that the aims and objectives of the FOT are not misquoted, misrepresented or misunderstood.

### Activity 19: Analyse FOT data

Tasks and Sub-Tasks	Person/Team/Organisation Responsible for Activity	Done
19.1 Develop a data analysis plan	Project Manager, Research Team, Technical Support Team	•
19.2 Analyse the objective (i.e. logged and recorded data)	Project Manager, Research Team	•
19.3 Analyse subjective data (i.e. data obtained from interviews, questionnaires, focus groups, hotlines, etc.)	Project Manager, Research Team	•
19.4 Draw conclusions with respect to the hypotheses generated for the FOT	Project Manager, Research Team	•
19.5 Sign off on completion of all required analyses	Project Manager, Research Team, Project Management Team, Project Sponsor(s)	•

#### Critical Considerations (the “dos” and “don’ts”)

- ✓ Plan for the fact that there will be constant demand for study findings, such as general trends in the data, early in the project, even though the data may not be statistically reliable enough to report with any confidence.

<ul style="list-style-type: none"> <li>✓ In a well-powered study, null findings (i.e. where no effect is found and the hypotheses refuted) are potentially as interesting as when the hypotheses are supported.</li> <li>✓ <i>Anticipate the requirement to have to perform supplementary analyses for the funding organisation, which may be expensive and not originally budgeted for. This will require negotiation with the sponsor if these analyses are expected to be carried out within the original budget.</i></li> <li>✓ Anticipate that, unless distance travelled is controlled for in the FOT, the distance travelled by different drivers will vary significantly. Take this into account in the analysis to ensure results are not skewed.</li> <li>✓ Don't forget to run "reality checks" on the data, to be sure that the data are "clean". This is essential.</li> <li>✓ <i>If data is reduced/aggregated, always keep a copy of un-aggregated data.</i></li> <li>✓ Ensure that all data analysts have used the test vehicles and understand the circumstances in which data was/is collected.</li> <li>✓ All team members who handle participant data should receive appropriate training regarding data privacy.</li> <li>✓ Work out how best to filter logged data and deal with missing data.</li> </ul>
<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ There may be a requirement to conduct ongoing analysis, such as ongoing identification of dangerous drivers, determining whether adaptation to systems is occurring early enough to warrant a shorter FOT duration (e.g. to save money and time), and to identify early trends in the data. These checks should be built into the analysis plan at the start of the project.</li> <li>✓ Some FOTs have developed novel ways of turning ADAS technologies on and off to control precisely the amount of exposure to the technologies that are being evaluated.</li> <li>✓ Sponsors need to be aware of the relative costs of running FOTs. For example, the cost of running simulation models at the end of the FOT to estimate safety and other benefits of ICT technologies is a fraction of the cost of preparing and deploying the FOT vehicles.</li> </ul>

<b>Activity 20: Write minutes and reports</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>20.1 Write minutes of regular project management team meetings</b>	Project Manager	•
<b>20.2 Write regular minutes of Project Steering Committee meetings</b>	Project Manager	•
<b>20.3 Write quarterly progress reports for the sponsor(s)</b>	Project Manager	•
<b>20.4 Write the draft FOT report</b>	Project Manager, Research Team, Technical Support Team	•

<b>20.5 Send the draft FOT report to relevant stakeholders and peers for peer review</b>	Project Manager	•
<b>20.6 Convene 1 or 2 meetings to discuss feedback with sponsor/peers</b>	Project Manager	•
<b>20.7 Incorporate feedback and write the final report</b>	Project Manager, Research Team, Technical Support Team	•
<b>20.8 Deliver the final report to sponsor(s)</b>	Project Manager	•
<b>20.9 Sign off on completion of all required reports</b>	Project Manager, Research Team, Technical Support Team, Project Management Team, Project Sponsor(s)	•

<p><b>Critical Considerations (the “dos” and “don’ts”)</b></p> <ul style="list-style-type: none"> <li>✓ <i>Use regular progress reports to document problems, solutions and lessons learned.</i></li> <li>✓ <i>Allow sufficient time for sponsor review of draft and final reports, but not so long that the review process drags out unduly. Six to 8 weeks is recommended.</i></li> <li>✓ <i>Consider peer review of major outputs; this will improve their quality but delay their release.</i></li> <li>✓ <i>Document all lessons learnt in the final FOT report.</i></li> <li>✓ <i>Ensure that the final report contains practical recommendations for wider-scale deployment of those systems found to be effective, and for fine-tuning of those with potential to be more effective.</i></li> <li>✓ <i>Develop, in consultation with the Project Steering Committee, a suggested plan for implementing the recommendations deriving from the FOT. Document the implementation plan in the FOT final report.</i></li> </ul>		
<p><b>General Advice</b></p> <ul style="list-style-type: none"> <li>✓ <i>The FOT lifecycle is long. Hence, it is advisable to write separate reports on each critical stage of the FOT, particularly the lessons learned, to ensure that nothing important that should be documented is forgotten.</i></li> <li>✓ <i>Formal meeting minutes are a critical resource for the project in confirming departures from the project plan.</i></li> </ul>		

<b>Activity 21: Disseminate the FOT findings</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>21.1 Send regular project reports to the sponsor</b>	Project Manager	•

<p><b>21.2 Disseminate preliminary and final findings at seminars, conferences and special events</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>21.3 Prepare reports on preliminary findings for the sponsor</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>21.4 Send sponsor draft and final FOT reports</b></p>	<p>Project Manager</p>	<p>•</p>
<p><b>21.5 Provide other stakeholders with access to the FOT final report(s) and, if allowed, raw or filtered data from the FOT</b></p>	<p>Project Manager, Research Team, Technical Support Team</p>	<p>•</p>
<p><b>21.6 Showcase the vehicles at relevant events during the FOT (e.g. Smart Demos, motor shows) to promote awareness and wider deployment of systems</b></p>	<p>Project Manager, Technical Support Team, Project Steering Committee, Project Management Team, Project Sponsor(s)</p>	<p>•</p>

**Critical Considerations (the “dos” and “don’ts”)**

- ✓ Disseminate the findings in accordance with the previously agreed communications plan.
- ✓ *Agree on what can and cannot be disseminated and said at different points in the study.*
- ✓ Seek necessary permissions prior to divulging FOT findings to any third party.
- ✓ FOT reports are large and expensive to print. Allocate a sufficient budget at the beginning of the project for printing.
- ✓ FOT reports are large and hard to read. It is desirable to produce conference papers along the way that document the outputs of the study at different phases. Prepare a concise 1 or 2 page synopsis of the study outcomes that can be read and easily digested by politicians, chief executives and relevant others in positions of authority.
- ✓ Agree in advance who is empowered to release and comment on results.

**General Advice**

- ✓ Where private industry is a participant in the FOT, it may be necessary to seek permission from the manufacturer before divulging certain information deriving from the FOT. This must be established.
- ✓ Maintain at least one vehicle for demonstrations; preferably at a location that is convenient to politicians, officials and the press.
- ✓ A demonstration and briefing to an influential politician is likely to be far more effective than sending them a report.

<b>Activity 22: Decommission the FOT</b>		
<b>Tasks and Sub-Tasks</b>	<b>Person/Team/Organisation Responsible for Activity</b>	<b>Done</b>
<b>22.1 Conduct de-briefing interviews with participants to elicit feedback on the FOT that can be used to improve future FOTs</b>	Project Manager, Research Team	•
<b>22.2 Dispose of test vehicles which are no longer needed (if vehicles are not privately owned)</b>	Project Manager, Research Team, Technical Support Team, Administrative Support Team, Project Management Team, Accounting/Auditing Advisor, Project Sponsor(s)	•
<b>22.3 Retrieve installed data logging equipment (if vehicles are privately owned)</b>	Project Manager, Research Team, Technical Support Team, Administrative Support Team, Project Management Team, Accounting/Auditing Advisor, Project Sponsor(s)	•

**Critical Considerations (the “dos” and “don’ts”)**

- ✓ Ensure that participants return relevant items at the end of the study (e.g. flash memory cards, i-buttons) and perform other required activities to decommission the FOT vehicles (e.g. disconnect power to support systems).
- ✓ *Keep one vehicle until all data analyses are complete.*
- ✓ Consider providing public access to FOT databases, where ethically allowed, that enables others to use the data for other research purposes after the FOT has been de-commissioned (but remember to fully explore and address anonymity issues). The data collected and stored after the FOT is de-commissioned should be regarded as “living data”.
- ✓ *Don’t lose momentum at the end of the FOT. Lobby stakeholders to ensure that there is commitment to implementing the recommendations of the FOT.*

**General Advice**

- ✓ *Consider keeping one or two vehicles as showcasing vehicles after the study, to allow stakeholders in positions of authority to experience the look and feel of the vehicles.*
- ✓ It may be necessary to consider legal issues of decommissioning the FOT as far as the de-installation of data logging equipment is concerned (in a contract with participants).
- ✓ In some FOTs, it may be possible for the test users to continue using the systems as part of a commercial service being offered near the end of the test period. It is important to consider the contractual arrangements at the end of the project and handover to commercial activities.

