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FOT-Net Data

FIELD OPERATIONAL TEST NETWORKING AND DATA SHARING SUPPORT



D5.2 Six FOT Methodology e-Learning Modules Online

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Introduction

FOT-Net offers e-learning modules about the FESTA methodology by organising webinars and making these presentations available on the project website.

In total, six webinars were recorded. The descriptive texts below are the ones on project website.

Webinar 1: Context, functions, use cases, research questions and hypotheses

Date: 12 November 2014

Total Registered¹: 30

E-learning Modules: <http://fot-net.eu/Documents/1335>

The objective of this webinar was to transfer knowledge about the FESTA methodology for designing and conducting Field Operational Tests. The FESTA handbook can be downloaded from: <http://fot-net.eu/Documents/festa-handbook-version-5-2014/>.

Oliver Carsten, of the Institute for Transport Studies of the University of Leeds, presented FESTA “V”. The FESTA handbook establishes a process to guarantee the best quality possible during each step when designing and conducting a FOT or NDS (Naturalistic Driving Study). The handbook went through a series of thorough revisions; the most recent one, revision 5, also includes NDS, cooperative systems etc.

Oliver Carsten presented the top down approach of the FESTA V, starting at the top left corner. This webinar focused on the preparation phase including the function identification & description, use cases and research questions & hypotheses. FESTA describes functions instead of ITS systems. Functions in the FESTA context relate to the aides that ITS technologies provide to the user. Functions can be automated, for example AEB (automated emergency braking), or a combination of functions, for example AEB and FCW (forward collision warning). A study can be designed around the single effect of each function or the combined effect of several functions. Studies involving cooperative systems are more difficult and complex to set up.

He then presented the 6 areas of potential system impact on behaviour based on Draskoczy et al². Systems can have a direct effect on the users and driving, or an indirect effect both on

¹ This is the number of people registered. The number of actual attendees at the Webinar is unknown as it was noted that one computer was used by more than one person.

the user and non-users. The system may modify the interaction between users and non-users and the accident consequences. There may also be an effect of combination with other systems.

Oliver Carsten explained the strategic, tactical and control levels of the driving task, based on the model developed by Michon³. Driving tasks are vehicle control, following the road, avoidance of collisions, monitoring of speed, rule compliance and way finding. Other mediating factors such as experience, attitudes etc. may play a role. The effect can be short-term or long-term and the effect of system design can be intended or unintended.

When setting up a study, the researcher must be aware which impact areas to cover, such as safety, efficiency, environment, mobility, acceptance and trust, usage, adoption and penetration.

Also a more bottom-up approach can be applied, starting from use cases and leading to the development of hypotheses concerning specific scenarios. The FESTA Handbook defines a use case as a specific event in which a system is expected to behave according to a specified function.

The webinar was concluded by a question from Haibo Chen: He described an accident in which he was involved when a reversing vehicle hit his car and the other driver complained that the rear camera didn't detect anything behind. He questioned if drivers are developing reliance on modern in-car technologies. Mr Carsten very much agreed and pointed out that FOT research needs to make sure that on-board devices do not replace driver's own safety checking.

² Draskóczy, M., Carsten, O. and Kulmala, R. (1998). Road safety guidelines. Deliverable B5.2 of CODE project (TR1103). Atkins Wootton Jeffreys, Birmingham, UK. Available at: http://cordis.europa.eu/telematics/tap_transport/library/code-b5-2.html.

³ Michon, J.A. (1985). A critical review of driver behaviour models. In Evans, L. and Schwing, R. G. (Eds.), Human Behavior and Traffic Safety. Plenum Press, New York, pp. 485-520.

Webinar 2: Performance indicators, Study design and Measures and Sensors

Date: 19 November 2014

Total registered: 25

E-learning Modules:

<http://fot-net.eu/Documents/fot-net-data-webinar-performance-indicators-study-design-and-measures-and-sensors/>

The objective of this second webinar was to transfer knowledge about the FESTA methodology for designing and conducting Field Operational Tests. Yvonne Barnard, of the Institute for Transport Studies of the University of Leeds and seconded to ERTICO, gave the main presentation.

She talked about performance indicators (PI), experimental procedures and sensors, and defining and arranging things to get the vehicles out on the road and collect data. Yvonne highlighted that PIs can be both objective (e.g. messages transmitted, speed, lateral position) and subjective (e.g. acceptance, workload, willingness to pay). PIs are usually designed for comparison because often the hypotheses are also defined in a qualitative way. From definition to measures, Yvonne explained five different types of measures, namely direct measures (raw data, e.g. distance to lead vehicle), indirect measures (pre-processed data, e.g. time-to-collision), events (e.g. overtaking manoeuvre), self-reported measures (e.g. questionnaire), and situational variables (e.g. weather data).

She highlighted that identifying crash relevant events is difficult in practice as no specific recommendations or commonly agreed trigger values are available. She presented four commonly used methods for the identification, which are driver response, safety function response, driving context and driving history. She recommended that a combined approach could be the most appropriate.

Yvonne presented a matrix in which PIs, measures and sensors are all related to each other and informed that there is a link in the FESTA handbook where readers can find the matrix excel sheet. PIs can also be related to impact areas such as driving performance and safety (e.g. driver's glance, speed), system performance and influence on driver behaviour (e.g. false alarms, interaction system-driver), environmental aspects (e.g. exhaust emissions, fuel consumption), traffic efficiency (e.g. travel time, mean speed), acceptance and trust (e.g. perceived usefulness, rate of use).

When talking about experimental procedures, Yvonne emphasized that a number of issues need to be covered for example participants, study design, experimental environment, and that conducting a pilot study to test the evaluation process is absolutely necessary. Sometimes controlled testing is the best method, for example for testing cooperative systems. Experimental rigour and scientific quality always need to be ensured.

Sensors are the instruments to help find out what we want to know and how to measure it. Yvonne explained different types of sensors to be used for different purposes and mentioned some specific sensors (e.g. video, vehicle-bus data, head/eye trackers, radar, map matching).

Yvonne finished her presentation by reiterating that the FESTA steps are not always that easy and need to consider iteration, resources, practicalities, ethical & legal objections, and data analysis issues. She reassured the audience that it is complicated but they can get help from the FOT implementation plan which is detailed in the FESTA handbook.

The webinar was concluded by two questions as listed below:

- The experimental procedures in an FOT take time and resources to be carried out. If my project has limited budget, which of these elements (e.g. participants, study design, experimental environment, a pilot study to test the evaluation process, controlled testing) should I focus first? Yvonne responded that the most important thing is to be sure what you want to know if you have limited resources. You can limit your research questions, simplify hypotheses, and make sure that you don't run into too many technical problems. Perhaps you can start with easy or cheap solutions for example by using of smartphones.
- How has the FOT methodology been implemented in practice such as in the CIP projects? Is the FOT implementation plan too general or too specific? Yvonne said that: "We've actually hear back from more specialized projects which followed part of the methodology. They take what is useful to them and follow a systematic approach. If you go to the FOT-Net website library (<http://fot-net.eu/library/>), you will find all the previous stakeholder meetings, international workshops, and seminars. You will find all kind of experiences that people report back from those projects. We try to collect and store those experiences and make them available for everyone so that we can learn from each other".

Webinar 3: Legal and ethical issues

Date: 26 November 2014

Total registered: 22

E-learning Modules:

<http://fot-net.eu/Documents/fot-net-data-webinar-legal-and-ethical-issues-26-november-2014/>

The objective of this webinar was to transfer knowledge about the FESTA methodology for designing and conducting Field Operational Tests, with a specific focus on legal and ethical issues which may be involved in an FOT.

Helena Gellerman from SAFER presented the legal and ethical part of the FESTA “V”. Her talk mainly covered the following aspects: participant recruitment, participant agreement, data protection and data ownership, system safety, approval for on-road use, insurance / responsibilities, video data collection in restricted areas, and ethical approval. Helena emphasized that the participants are the core of FOT/NDS and advised that their data and privacy must be treated with great respect.

Helena discussed European directives and regulations regarding these issues and informed that the interpretation of these may vary from country to country, and hence an FOT project should always check the national legislation and involve legal expertise at the level of every Member State, based on predefined data logging facilities and specific systems/applications.

To recruit right participants, Helena advised that insurance coverage for the whole fleet would be needed. If a participant uses his/her own vehicle or fleet, their insurance coverage would also need to be checked. Helena explained that this checking would be even more important for cross-border travels.

Helena addressed that participant agreement is legally a signed contract between the participant and handling organization, and should include information regarding topics like obligations, liabilities, insurance issues, logging of personal data, the scope of processing over the lifetime of the data, if a participant commits a traffic offence, responsibility for minor damages to the vehicle and payment of any insurance excess. It should also ask the participant if their data could be re-used and shared after the project. Helena explained that there are different national requirements for an ethical approval in Europe and that the process can be time-consuming and needs to be included in the project plan.

Helena explained that special care should be given to if video data collection is taking place in restricted areas, in which it is illegal or prohibited to video externally, e.g. border crossing, military locations, private premises, e.g. goods delivery.

Helena covered the topic of data protection and data ownership. She informed that, as an example, transfer of data across Europe is ok but transfer to countries outside Europe need

a special participant consent. Helena then explained how special care must be taken to the personal integrity in situations such as vehicle internal video/audio recordings and cameras towards vehicle surroundings. The data protection requirements on storage and handling of video and GPS are high as the data can reveal identity. This especially applies to video shown outside the secure storage environment, where the data should be anonymized.

Helena presented a list of data protection measures, including that appropriate education on personal integrity issues should be given to persons handling and analyzing the data, data infrastructure should be protected from intrusion, personal IDs should be sufficiently encrypted and kept separate from the main database and data should be encrypted before transferred.

The webinar was concluded by a question (from Haibo Chen): Does the handbook provide dos and donts or best practices for system safety? Helena explained that there was not so much of this in the FESTA handbook. This could be addressed when we update the methodology at the end of this project.

Webinar 4: Databases, data analysis and hypotheses testing

Date: 20 May 2015

Total registered: 29

E-learning Modules: <http://fot-net.eu/Documents/1942/>

The objective of this webinar was to transfer knowledge about the FESTA methodology for designing and conducting Field Operational Tests, with a focus on databases, data analysis and hypothesis testing. The webinar was led by Felix Fahrenkrog (Aachen University) and moderated by Haibo Chen (Institute for Transport Studies, University of Leeds).

The supporting document of this webinar is the FESTA handbook, which establishes the process to guarantee coherence and quality across the whole research process. Among the different recommendations extracted from the FESTA methodology and explained in the webinar are, for example:

- Check whether the selected datasets and data analysis are feasible before starting the FOT
- When building a database, dedicate a column in the table to each specific measure
- Video data analysis is generally quiet time and resource-consuming. When using these resources, store them on a dedicated place using links
- Real-time data synchronization is mandatory
- Whenever possible, do the required calculations in the data processing phase before transferring the data into the database
- Undertake quality checks of both the measured data and the calculated data (interpolating, derived measures, indicators, etc.) as the quality of results will depend on the quality of data.

Webinar 5: Impact assessment and socio economic cost benefits analysis

Date: 27 May 2015

Total registered: 22

E-learning Modules: <http://fot-net.eu/Documents/festa-webinar-impact-assessment-and-socio-economic-cost-benefits-analysis-27-may-2015/>

The objective of this webinar was to explain the FESTA methodology for designing and conducting Field Operational Tests, with a focus on impact assessment and socio economic cost benefit analysis. The webinar was led by Pirkko Rämä (VTT Technical Research Centre of Finland) and moderated by Haibo Chen (Institute for Transport Studies, University of Leeds).

Impact assessment investigates the impacts of a technology on society and provides decision-makers with relevant information in a concise format. Predictions of the future, particularly over the medium or long term, cannot be precise.

This argues for a scenario-based approach when developing forecasts of how future deployment of a system might turn out. This approach permits alternative scenarios to be evaluated in the cost-benefit analysis (CBA). CBA follows a four-step-process involving framework and preparatory work, measuring impacts, appraising impacts in a common monetary value and confronting the discounted society benefits with the costs of the policy measure.

Webinar 6: How to enable a successful data sharing and re-use process

Date: 24 May 2016

Total registered: 47

E-learning Modules:

<http://fot-net.eu/Documents/fot-net-data-webinar-on-data-sharing-24-may-2016/>

In this webinar, project partners presented the main topics related to performing a successful data sharing and re-use process. These topics are applicable to both FOT and NDS – but they are also relevant for any other areas of research.

Helena Gellerman from SAFER started this presentation by highlighting the main areas in the FESTA “V” where data sharing addressed. It basically happens during the complete course of an FOT -:

- Before the FOT: agreements, e.g. ownership, data access
- During the FOT: what data to collect, test sites - legal situation, data documentation, data protection, analysis tools, and central/distributed data
- End of the FOT: financial model, services

Helena then presented the current status of the development of the data sharing framework and explained its seven topics, namely (1) data sharing in general project documents; (2) data and metadata descriptions; (3) data protection recommendations; (4) training on data protection; (5) support and research services; (6) financial models; and (7) application procedure.

Finally, Helena brought up the main challenges of data sharing, in particular at the global level (due to different funding schemes and legal settings), and barriers to share data among data owners.

Webinar presentations

- [Welcome and introduction to the FOT-Net Data webinar](#) – Haibo Chen (ITS Leeds)
- [How to enable a successful data sharing and re-use process](#) – Helena Gellerman (SAFER)
- [Upcoming FOT-Net Data activities](#) – Davide Brizzolara (ERTICO ITS-Europe)

Conclusion

FOT-Net Data successfully delivered six webinars for on-line transfer of knowledge and experiences among the FOT community. Webinars used the successful format of the previous FOT-Net 2 project as a basis for creating the presentations efficiently.

The first five webinars were based on the FOT methodology and the FESTA Handbook, which were revised at the end of the FOT-Net 2 project. The last webinar addressed data sharing and data re-use, based on the outcomes of this project and the experiences gained during the workshops organised during the course of FOT-Net Data.

The webinars were especially targeted to participants who were (relatively) new to FOTs and NDS, or who wanted to become familiar with the methodology. The materials and presentations used in the webinars were used to create stand-alone e-learning modules that were put on-line on the project's website for self-study.