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FOT-Net 2

Field Operational Tests Networking and Methodology Promotion

REPORT ON FOT SEMINARS

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Author(s)	Haibo Chen, Erik Thomasson, Yvonne Barnard (University of Leeds)
Co-author(s)	
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Executive Summary

A key target of FOT-Net partners is to support a fast market deployment of ICT-based systems for transport. By supporting actively national and European FOTs, the two FOT-Net Support Actions have contributed to bringing more momentum to FOT activities in Europe and created a wide diversity of comparable assessment of ICT-based technologies related to safer, cleaner and more efficient transport.

The seminars organised in the FOT-Net 1 project found considerable interest from the FOT-community and great need for information and support in the organisation and implementation of FOTs.

To continue the success of the seminars in FOT-Net 1, six new seminars were planned in FOT-Net 2 supported by other tools (e.g. working groups, workshops and webinars) to ensure a good exchange of information between the FOT experts and stakeholders. Each of the seminars has specific topics which have been explicitly articulated by the FOT network and need common European positions.

In Year 1, two seminars were held on: practical issues in starting up a FOT of cooperative systems, and the interpretation and presentation of results at the end of a FOT.

In Year 2, two seminars were organised: a special seminar for people who are new to FOTs and have only recently started to work in a FOT to bring them up to speed with the FESTA methodology, and one on the question of how to compare results from different FOTs and re-use of data.

In Year 3, two seminars were be organised. The fifth seminar focused on tools for gathering and analysing data, especially in FOTs of cooperative systems. The final seminar was concerned with FOT achievements and opportunities for the future.

In addition, there was an extra seminar on FESTA and impact analysis for CIP (Competitive and Innovation Framework Programme) pilot projects.

The seminars were aimed at people involved (or who want to be) in national and European FOTs. They were organised at different locations and whenever appropriate, combined with other relevant events.

There were a number of presentations delivered by invited specialists from both inside and outside the FOT-Net consortium, within Europe and beyond.

A selection of the materials used in the seminars is available on the project website[1] and the FOT-Net Wiki[2].

The seminars have been proven to be a useful and effective tool to share user experience and obtain feedback on the FESTA methodology. The success of the seminars was measured in terms of value of attendance, quality of presentations, quality of discussions, quality/relevance of themes, duration and location.

[1] http://www.fot-net.eu/

[2] http://www.fot-net.eu/en/catalogue/fot_wiki.htm

At the end of each seminar, participants were asked to evaluate the seminar by means of a questionnaire. The results from the seven seminars show that the seminar sessions (presentations and working groups) were appreciated very well, on average 80% were rated as good to very good. The participants indicated that the seminars have met their expectations, with two thirds of the respondents answering 'Yes' for the seminar that they attended. Also, the majority of the participants believed that the information provided at the seminar was useful for them.

1 Introduction

A major objective of the FOT-Net project was the transfer of knowledge on the methodology of performing field operational tests and the sharing of experiences. This deliverable provides a report on the activities performed in work package 4, FOT knowledge transfer and learning.

The work package built on the experiences gained from the successful seminars organised in FOT-Net 1. The activities focussed on both European and national FOTs in the last phase of their life-cycle as well as the newly started FOTS, with a special focus on Cooperative systems FOTs. The main objectives were:

- Maintain through training the European framework and approach for FOT implementation together with the National FOT activities
- Transfer of practical knowledge gained in FOTs
- Thematic training of FOT participants on FOT developments
- Learn from the experience of FOT participants at National, EU and Global level (and provide a feedback to create a better methodology)

This deliverable contains the reports on the seminars. The feedback on the methodology will be described in D4.3, Feedback to FOT Methodology (Seminar results). The deliverable is organised as follows. First an introduction to the seminars and their general issues are given in Chapter 2. In Chapter 3-9, the seven seminars are reported. Chapter 10 gives a summary of the evaluations of the seminars. In Chapter 11 the conclusions can be found.

1.1 FOT-Net contractual references

FOT-Net 2 is a Support Action submitted for the call FP7-ICT-2009.6. It stands for *Field Operational Tests Networking and Methodology Promotion.*

The Grant Agreement number is 269983 and project duration is 36 months[3], effective from 01 January 2011 until 31 December 2013. It is a contract with the European Commission (EC), Directorate General Information Society and Media (DG INFSO).

The EC Project Officer is:

Myriam Coulon-Cantuer
EUROPEAN COMMISSION
DG CONNECT
Office: BU31 04/059
B - 1049 Brussels
Tel: +32 2 299 41 56
E-mail: Myriam.Coulon-Cantuer@ec.europa.eu

[3] The project has been given an extension of three months from 01/01/2014 to 31/03/2014 inclusive.

1.2 Project Objectives

The prime goal of FOT-Net 2 is to increase the momentum of the network achieved in FOT-Net 1 by further developing the strategic networking of existing and future National, European and Global FOTs i.e. US and Japan. During 36 months, the FOT Network has met through six bi-annual FOT stakeholders meetings and three international FOT meetings.

FOT-Net 2 also focuses on methodology based on recent FOT experiences. Through a series of targeted meetings, it gathers the relevant experts to revise and adapt the FESTA methodology for FOTs on ADAS, nomadic devices, cooperative systems, and in addition, addresses Naturalistic Driving Studies (NDS).

Five new expert working groups have been created in order to clarify critical topics related to the legal and ethical issues, data analysis, incident definition, impact assessment and scaling up, and data sharing. The revised FESTA methodology is promoted through seven seminars supported by webinars.

FOT-Net 2 creates a new web-based inventory of existing tools for data acquisition, database structure, data analysis to facilitate the setup of new FOTs.

FOT-Net 2 continues to act as a multiplier for the dissemination and awareness of FOT activities especially in terms of inter-activities support and outreach.

Finally, FOT-Net 2 evaluates contributions of FOTs to policy goals and market deployment using an improved methodology for stakeholders' analysis.

2 The FOT-Net seminars

2.1 Summary of the seminars

The following seminars were organised:

Seminar 1: Practical issues in starting up a FOT of Cooperative Systems and defining research questions, hypotheses and performance indicators

Vigo, 15 April 2011

Topics:

- The FOT methodology (FESTA), and the lessons-learned and open questions with regard to cooperative systems
- Research questions of current projects and the relation with their impact areas
- Formulating research questions and hypotheses
- Performance indicators from current projects
- Performance indicators and design of data collection process
- Needs of cooperative system FOTs

Seminar 2: Interpretation and presentation of results

Aachen, 29 November 2011

Topics:

- Taking into account the impact question from the beginning of a project
- Interpretation of results
- Presenting negative and positive outcomes of a FOT
- The stakeholder's point of view
- Experiences and good practice on dissemination and publicity
- Drafting a press release on an outcome of a FOT

Seminar 3: FESTA for Beginners

Pisa, 09-10 May 2012

Topics:

- Context, function selection and use cases
- Research questions, hypotheses and performance indicators
- Study design, measure, sensors and data collection
- FOTIP and how to use the FESTA handbook
- Stories from FOTs
- Ethical and legal issues
- Databases and data analysis
- Analysis of research questions and hypotheses and systems and functions
- Socio-economic impact assessment

Seminar 4: Complementarity of different FOTs and re-use of data

Brussels, 26 November 2012

Topics:

- euroFOT and TeleFOT: how their results and methods contrast from and complement each other
- Combining some results from euroFOT and TeleFOT
- Complementarity of cooperative systems projects
- Practical experiences from (re-)using data from Naturalistic Driving and FOT data sets
- European view on data sharing
- Requirements for data re-use and challenges and opportunities for combining results and sharing data

Extra seminar: FESTA and impact analysis for CIP pilot projects

Barcelona, 4-5 April 2013

Topics:

- Standardisation in the approach to Impact Analysis
- Impact analysis and examples performed in FOTs
- CIP pilots and their approaches to evaluation
- FESTA methodology, and the applicability for the pilots for evaluation and impact assessment
- Evaluation methods in the pilots, especially for answering research questions
- Plans and approaches on impact assessment and scaling up in the pilots
- Issues with impact analysis

Seminar 5: Tools for gathering and analysing data, especially in FOTs of cooperative systems

Berlin, 25 April 2013

Topics:

- Overview of tools for data gathering and analysis in FOTs
- Tools for data gathering in different FOTS
- Tools used in experimental design and test execution
- Tools for data analysis for cooperative system FOTs
- Tools for data analysis for cooperative system FOTs
- Experiences and good practice on tools for gathering and analysing data

Seminar 6: FOT achievements and opportunities for the future

Versailles, 23 September 2013

Topics:

- Best practices in each of the three stages in the FESTA methodology: Preparing, Using and Analysing
- Lessons learned and needs for practical guidelines

- Outcomes and achievements from FOTS and deployment strategy.
- The future for FOTs and FESTA

2.2 Summary of the Participants

Participants (or heads)

There were 180 participants (or heads) who attended 7 seminars and the following figure shows their breakdowns by seminar.

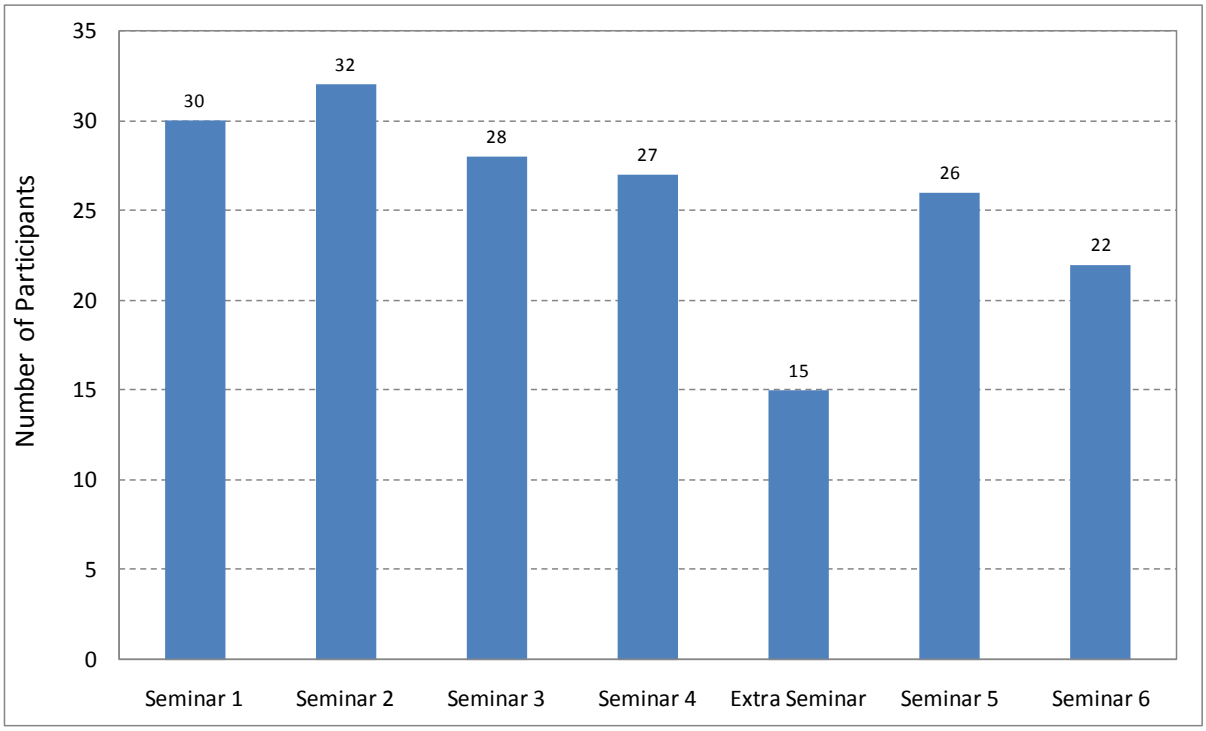

Figure 1: The number of participants by seminar

95 of the participants were the FOT-Net partners, 28 were the project associated partners and the remaining 57 came from other organisations. On average, 25.7 participants attended each seminar. Without counting the extra seminar in Barcelona (which was targeted at a specific group), each of the regular seminars had 27.5 participants.

Individuals

In total, there were 126 individuals who attended at least one seminar.

- 54 of them were the FOT-Net partners
- 21 individuals were from associated partners and
- 51 people came from other organisations.

Countries

There were 14 countries involved in the seminars and the following table shows the breakdown.

Table 1: Countries of Participants

No	Country	Number
1	Greece	1
2	Norway	1
3	USA	1
4	Denmark	2
5	Austria	3
6	Finland	3
7	France	5
8	Sweden	7
9	Netherlands	8
10	UK	8
11	Italy	10
12	Belgium	15
13	Spain	25
14	Germany	37

Organisations

A total of 68 organisations were involved in the seminars.

- 15 FOT-Net partners, all participated
- 10 associated partners
- 43 organisations that are neither partner nor associated partner

Gender

Of the 126 individual participants 32 (25%) are female and 94 male (75%).

2.3 In relation to FESTA

In the European FESTA project (Field opErational teSt support Action), a consortium of a large number of partners – both industrial and academic – has developed a methodology to conduct FOTs (Field Operational Tests). Using such a methodology guarantees a sound approach to conducting FOTs and obtaining reliable results, and allows for data and results that may be compared between tests. A handbook was written in which the methodology is described in detail (FESTA, 2008). In FOT-Net 2, in 2011, this handbook was updated (http://wiki.fot-net.eu/index.php?title=FESTA_handbook). A further revision is currently made, also based on the experiences from the seminars. The methodology consists of a process which systematically details the steps to be taken to set-up the FOT, the actual data acquisition, the analysis of the data and evaluation and interpretation of the results, see Figure 2.

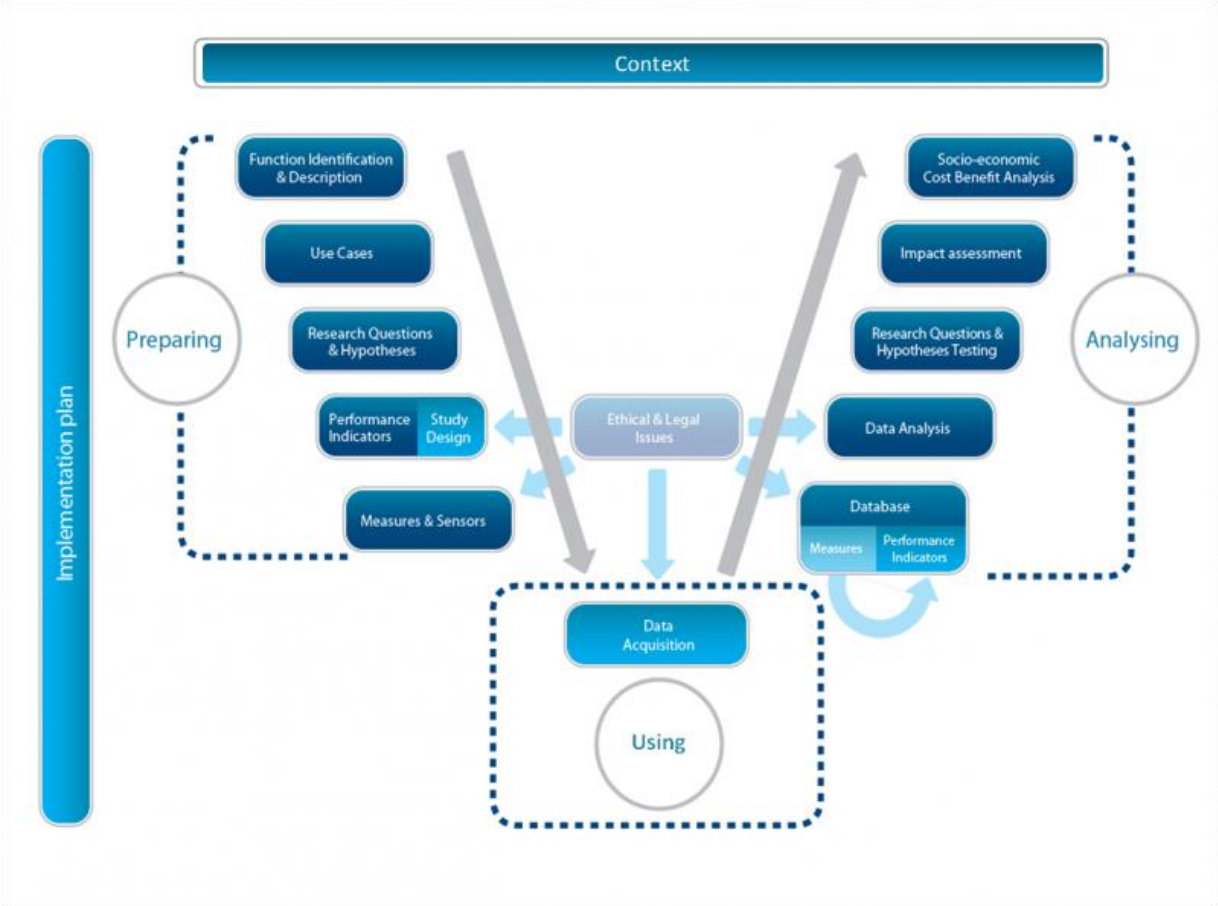

Figure 2: The FESTA-V

One of the goals of the FOT-Net project is to promote the adoption of the FESTA results – a common methodology for all FOTs, and to facilitate the exchange of knowledge. In order to transfer the knowledge developed in the FESTA project, six seminars were organised, held between April 2011 and September 2013. Additionally, an extra seminar targeted at the electro-mobility CIPs was organised.

2.4 Organisation of the seminars

The seminars were organised in order to transfer knowledge on the different phases of the FESTA methodology and to share experiences. The seminars were organised in a similar way as in FOT-Net 1, because this had proved to be a successful formula.

In Deliverable D4.1, FOT seminar planning, developed at the beginning of the project, detailed plans and checklists were defined. This deliverable served as the guideline for organising the seminars.

All seminars were announced on the FOT-Net website, in the FOT-Net newsletter and by direct mail to the FOT-Net mailing list. Several announcements and updates of agendas were made for each seminar. Participants could register electronically. After the seminar they were sent a full report of the event, including the outcomes from the small group exercises. Reports were also made available on the FOT-Net website, and short reports were published in the newsletters.

In the seminars there usually was a mix of presentations and interactive sessions. All seminars had activities in small groups in which participants were presented with problems they had to solve, for example defining hypotheses for evaluating systems or discussing how the impact of a system could be measured. The results were reported and discussed in plenary sessions. Also interactive discussions, question sessions and panel sessions were part of the agendas. In this way we ensured that the seminars answered the goals of both knowledge transfer and exchange of knowledge and experiences. Most speakers and facilitators came from the European and national FOTs, with different backgrounds, coming from industry, public authorities, consultancy, and research institutes and universities. Both experts and novices in FOTs and related areas attended. Many attendees were involved in a FOT themselves.

Participants were asked to complete an evaluation form after each seminar. In general they gave very positive feedback; the appreciation of sessions was mostly “good” and “very good”. Most of the participants answered the question on whether the information was useful to them with “yes”. During the seminars most participants showed a very active attitude, engaging enthusiastically in the interactive sessions. A summary of the evaluations is given in section10.

2.5 Coverage of the FESTA-V phases

The seminars covered the different phases in the FESTA-V, see Figure 3 . Seminar 1 addressed the first part of the V and the FOT-IP, with a focus on the recently started FOTs on cooperative systems. Seminar 2 focussed on the right hand side of the V, especially of interest of FOTs like euroFOT and TeleFOT that were reaching that phase, but also for other FOTs because the impact analysis has to be taken into account from the beginning. Seminar 3 focussed on the whole V, and gave an overview of the methodology especially for participants who were new to FOTs and FESTA. Seminar 4 again addressed the whole V, looking back at the FOTs that were finished, especially euroFOT and TeleFOT, in order to draw lessons about complementarity of FOTs and looking forward on how data may be shared. At this seminar ideas were conceived for the FOT-Net Data project, which will start in January 2014. Seminar 5 addressed the lower part of the V, and had again a focus on cooperative system FOTs, like FOTsis and DRIVE-C2X. Seminar 6 was less focussed on the methodology and more on achievements and the future of FOTs. The extra seminar addressed the right hand, especially the impact assessment, and its relation to the study plan, and was organised especially for the four electro-mobility CIPs, for whom impact assessment is especially important because they are close to deployment.

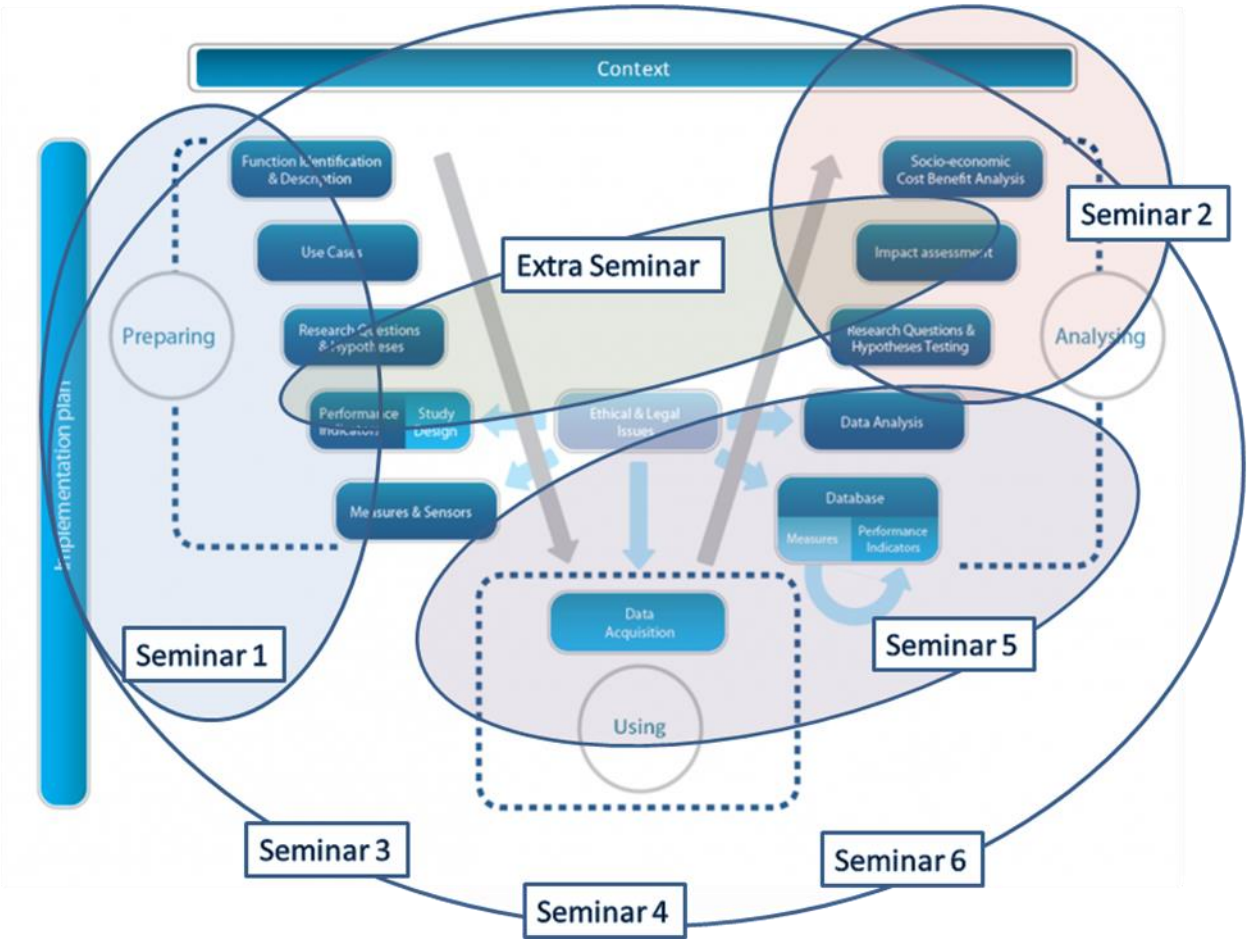

Figure 3 Coverage of the FESTA V by the seminars

3 Seminar 1: Practical issues in starting up a cooperative systems FOT

3.1 Topics

The first seminar of the FOT-Net project aimed to help start up a FOT for road safety and traffic efficiency projects, in particular the cooperative systems based on vehicle-to-vehicle and vehicle-to-roadside infrastructure communication. More specifically, the seminar focused on practical issues in defining research questions, hypotheses and performance indicators.

The seminar specified several topics including:

- The FOT methodology (FESTA), and the lessons-learned and open questions with regard to cooperative systems
- Research questions of current projects and the relation with their impact areas
- Formulating research questions and hypotheses
- Performance indicators from current projects
- Performance indicators and design of data collection process
- Needs of cooperative system FOTs

3.2 The agenda

The seminar was held on 15th of April 2010 in Vigo, Spain. The theme and timing were chosen in response to two large cooperative system FOTs, which had recently started: DRIVE C2X and FOTSis.

The agenda was as follows:

1. Welcome and Introduction to CTAG (David Sanchez, CTAG)
2. Introduction to FOT-Net (Maxime Flament, ERTICO)
3. The FOT methodology (FESTA), and the lessons-learned and open questions with regard to cooperative systems (Yvonne Barnard & Oliver Carsten, University of Leeds)
4. Presentations from current projects on their research questions and the relation with their impact areas:
   a. FOTsis: Emilio Cacheiro Diéguez (OHL Concesiones)
   b. SISCOGA: Rosa Blanco (CTAG)
   c. DRIVE C2X: Oliver Sawade (Fraunhofer FOKUS)
   d. SimTD: Thomas Hecker (TU-Berlin)
5. Small group work with exercise on formulating research questions and hypotheses (Yvonne Barnard & Oliver Carsten, University of Leeds)
6. Presentation from the North-West Traffic Management Center (Ramiro Martinez, DGT)

7. Presentations from current projects on performance indicators:
   a. SISCOGA: David Sanchez (CTAG)
   b. FOTsis: Alfonso Basabe (IRIDIUM)
   c. SimTD: Thomas Hecker (TU-Berlin)
8. Small group discussion on performance indicators and design of data collection process (Oliver Sawade, Fraunhofer FOKUS)
9. Panel discussion on needs of cooperative system FOTs (chaired by Ilja Radusch, Fraunhofer FOKUS)

3.3 Summary and conclusions

The seminar was hosted by CTAG and organised by CTAG, University of Leeds and Fraunhofer FOKUS. There were 30 participants.

The seminar was specially designed to support recently started projects in the field of cooperative systems in the initial phases of the FESTA methodology. The audience largely consisted of persons involved in FOTsis, DRIVE C2X and SISCOGA, which is also a regional site for the DRIVE C2X project (this proved to be the only seminar where the majority of those attending were not from a research institute or university).

The seminar was planned to present each project's current status, provide group work to illustrate challenges faced at examples and to bring together researchers from cooperative system FOTs. It was accompanied by presentations and a live demonstration from the SISCOGA test site and CTAG.

The FOT methodology (FESTA) and the lessons-learned and open questions with regard to cooperative systems

Yvonne Barnard and Oliver Carsten started the seminar's main part by introducing the FESTA methodology and important terms when talking about cooperative systems.

They explained the process of FESTA with specific focus on research questions and performance indicators, which would be the major topic for the seminar.

As FESTA was not primarily written for cooperative systems, they explained missing topics in the handbook and lessons learned from CS FOTs, which will be included in a re-working of the FESTA handbook.

Presentations from current projects on their research questions and the relation with their impact areas

Next up, representatives from two established FOTs (simTD and SISCOGA) and two more recently started FOTs (DRIVE C2X and FOTsis) showed their project's impact areas and research questions.

Presentations started by explaining the project details and current general status. The specific section on research questions showed a wide view on the meaning of research questions and reflected the fact, that not all of these projects follow the FESTA methodology. It was also apparent, that there is no unique glossary within the CS research field.

Small group work with exercise on formulating research questions and hypotheses

In a small group-work activity, the participants were asked to find research questions and hypotheses to hypothetical functions: the in-vehicle emission management and the slippery road warning system.

For the in-vehicle emission system the vehicle was said to be drivable in either a normal or an economical mode. Drivers could choose between them and the system could also be set from a central TMC.

General questions to this function were based mainly on driver acceptance factors and the question of whether a vehicle could in general be affected by outside decisions. A major question was therefore “can you force users to drive in clean mode” and “what is the impact on the environment if doing so?”

Research questions regarding the network efficiency were based around the question of impact on traffic flow by activating the clean mode on some or all of the vehicles.

The Slippery road warning is a more practical example, which is also included in most current CS FOTs. Vehicles, which detect slippery road conditions (e.g. by ESP actuation) send out warning messages to approaching vehicles.

One group concentrated on the RQs regarding safety and mainly onto possible negative side effects on users by introduction of such a system. “Does the system impose over-confidence in users?” or “what happens, if the system fails?”.

The other group concentrated on the impact in network efficiency and formulated questions regarding the imitation effect (“Does the system help users of non-equipped vehicles”) and on the trade-off between safety and efficiency.

Presentation from the North-West Traffic Management Centre

Mr. Martinez from the regional Traffic Management Centre was invited to the seminar, because his organisation is involved in the SISCOGA test site and project. He explained about the regional infrastructure, the used technology and the involvement to the SISCOGA project.

Presentations from current projects on performance indicators

Representatives from the projects FOTsis, simTD and SISCOGA explained the identified performance indicators in their projects and the data acquisition methods they used.

For SISCOGA an example function was presented: the Adverse Weather Warning. From a number of hypotheses such as “The driver reduces his speed after receiving the warning”, performance indicators were derived, e.g. the maximum speed, the headway, the average number of hard braking situations etc. This data will be gathered in-vehicle from a CAN-bus logger and externally from RSUs (Road Side Units). Also questionnaires will be given to users to evaluate user acceptance indicators.

For FOTsis, a more general introduction to their methodology process was given. As the project is focussed on the infrastructure side, their performance indicators are focussed on traffic efficiency and environmental factors, but of course safety is also considered.

In simTD, the focus is more set on the vehicle side, reflecting impact areas that are more concentrated on safety and individual traffic efficiency. It was explained, that the data collection process is also critical. simTD expects a volume of 100mb per hour of operation per vehicle. As the project will run up to 400 vehicles on a daily basis, the amount of data generated will be high. To pre-validate, if all necessary performance indicators can be derived, the project relies on simulations.

Small group discussion on performance indicators and design of data collection process

In this group exercise, the practical application of the first half of FESTA methodology was continued. For this purpose, three groups were formed and each was given one exemplary function and one hypothesis. To prove or disprove this hypothesis, groups had to identify performance indicators and measurements. In a second step the experimental design (boundary conditions) and the data gathering system had to be sketched.

The first group had to analyse the Traffic-Jam Ahead Warning with the hypothesis that this function reduces crashes when approaching jams. As performance indicators they chose the number of critical situations, which were to be measured by position, speed, braking pressure, ESP status and the airbag status (for very critical situations). They expected to use 5-10 cars for controlled tests and 50-100 cars for naturalistic tests. The group calculated that each vehicle will produce around 500mb of data per day and they choose to gather this data by USB device from the cars.

The second group worked on the Green-light optimal speed advisory function and the hypothesis that this reduces time spent at red lights and travel time. They chose as performance indicators the time spent at zero speed, the queue length in from of traffic lights, the number of red-light violations and the network travel time. They choose to gather the data directly by transferring it to the RSU on the traffic lights.

The third group was given the Weather Warning function and the hypotheses that drivers using this function will reduce their speed before encountering the adverse weather condition. They picked as performance indicators, the vehicle speed, the brake actuation and gear + rpm, which could be directly mapped to measurements. They expected to test this function with 100 vehicles for a naturalistic approach and 50 for controlled testing. They would transfer measurements over 3G network and use up central storage of up to 1TB.

Panel discussion on needs of cooperative system FOTs

In a final panel discussion, all speakers gave a final summary of their lessons learned and general impact to cooperative system FOTs. Emphasis was placed by all speakers on the interoperability for the technical level and the comparability on methodology level for the current CS FOTs throughout Europe. It was agreed that to achieve such features it would be helpful to have a common set of functions; a common set of performance indicators and not the least a common glossary.

A major issue with CS FOTs was identified in the low frequency of events due to the small penetration of functions over more than one vehicle. Solutions given by the speakers were to use sophisticated simulation tools or to employ methods of controlled testing.

It was also identified that it would be difficult to get enough non-professional drivers for CS FOTs. Since no CS systems are in the market, all vehicles would have to go through a (costly) adaptation. This might also scare away drivers. It is especially difficult to find those drivers that are using a particular (RSU equipped) stretch of road often enough. Possible solutions were to advertise in local newspapers or to contact automobile clubs to help. The downside of this however, could be to also attract unwanted attention to a prototype system, possibly influencing participating drivers. An interesting solution was presented from the Netherlands, where the FOT operator used number plate recognition (ANPR) to identify frequent passing vehicles. Details were given to local authorities to contact the respective drivers to ask them about FOT participation.

It is still a major question, what the user acceptance will be for CS. Drivers need to be educated about this new level of functions. While ADAS systems are relatively easy to explain to potential users, the CS functions are not known to the public and reaction is difficult to estimate. A good scheme for driver education based on the acceptance of prototype systems is therefore a major goal for CS FOTs.

Conclusions

In this seminar, current cooperative system FOTs were advised on the appliance of the FESTA process to CS, on the process of finding research questions, performance indicators and measurements. The impacts of these decisions on the test design and data collection were discussed.

Presentations from SISCOGA, simTD, FOTsis and DRIVE C2X showed the current project status and issues encountered.

In small group work, the participants got to know the first half of the FESTA process “hands on”. They formulated research questions and hypothesis in the first exercise and took this further to performance indicators, measurements and implications to test design in the second exercise.

The seminar was completed by a test drive in the SISCOGA vehicles, a guided tour through CTAG and a presentation from the regional Traffic Management centre.

The headline result from the participant’s evaluation forms was that 71% felt that the seminar had been useful (and the rest ‘partly useful’).

4 Seminar 2: Interpretation and Presentation of Results

4.1 Topics

The seminar specified several topics including:

- Taking into account the impact question from the beginning of a project
- Interpretation of results
- Presenting negative and positive outcomes of a FOT
- The stakeholder's point of view
- Experiences and good practice on dissemination and publicity
- Drafting a press release on an outcome of a FOT

4.2 The agenda

The seminar was held on 29th of November 2011 in Aachen, Germany.

The agenda was as follows:

1. Introduction: Adrian Zlocki (IKA)
2. How do you take into account the impact question from the beginning of a project?: Barbara Metz (University of Wuerzburg)
3. Interpretation of results: Moderator: Oliver Carsten (University of Leeds)
   - euroFOT: Freek Faber (TNO)
   - Lancashire ISA: Frank Lai (University of Leeds)
   - TeleFOT: Pontus Engelbrektsson (Chalmers University), Ruth Welsh (University of Loughborough)
   - Drive-C2X: Pirkko Rämä (VTT)
4. Exercise on presenting negative and positive outcomes of a FOT: Eline Jonkers (TNO)
5. The stakeholder's point of view: Moderator: Yvonne Barnard (University of Leeds)
   - Point of view of politicians - Lars Tysklind (Swedish MP, Committee on Transport and Communications)
   - Discussion on other points of view
6. Experiences and good practice on dissemination and publicity
   - Introduction: Irina Silva (ERTICO)
   - The Freilot approach: Zeljko Jeftic (ERTICO)
   - From FOT to implementation strategies: getting public, authority and stakeholders' awareness of ISA: Sven Vlassenroot (University of Ghent)
7. Small group exercise: drafting a press release on an outcome of a FOT: Irina Silva (ERTICO)

8. Conclusions and wrap-up: Yvonne Barnard (University of Leeds)

4.3 Summary and conclusions

There were 32 participants.

Interpretation of results

During the discussion it was stated that interpretation is not immediately obvious from the collected data

- Research of impacts:
- Driver reactions (behaviour and opinions), show benefits (users, industry, transport system managers), enhance deployment
- Different impact focus for different target groups

The difficulties / challenges in the interpretation were identified as: indirect impact assessment, up-scaling, de-bundling, integration

- Why is the expected outcome not the same as the outcomes from the data?
- Different system configurations, sample size too small for fully interpreting results, especially when disaggregating data
- Merging data across FOTs
- Between subjects design adds complexity
- Multi-function systems are assessed
- Budget, recruitment, drop-out, time constraints
- New research questions may come up when the data are analysed, but time and budget is a problem

Some solutions were provided:

- Plan for impact from the very beginning, consequences for data logged and hypotheses
- Pilots are very useful for getting a feeling for system impact and data quality; don't assume data are OK because they look OK
- You need a lot of effort and interaction between partners to ensure the impact questions can be answered
- Focus on the main findings first
- Significant is not the same as meaningful
- It takes time to conclude what is really important
- Use other FOT data for interpretation
- Assumptions have to be made for interpretation, these should be made explicit

What happened in reality?

- You need to ask participants, otherwise you might just speculate
- You need to measure how participants perceive the product
- More consideration should be given to subjective data, and there is a potential for overconfidence in logged data
- Open questions reduce uncertainty in interpretation

- Create understanding, not only descriptive statistics
- Subjective data are not enough for interpretation, collect “meta-data”: problems and issues encountered, specific to participant or country
- Exit interview, identify reasons for lack of use of device

Identified recommendations on impact are:

- Keep it simple: it’s hard to give up your own agenda!
- Stakeholders: bring them together and discuss the issues, involve them, have a manageable set of research questions

Exercise on presenting negative and positive outcomes of a FOT

The participants were divided into four groups and were given the exercise to create a poster which shows the results of a FOT. The design of the different posters varied a lot. The participants created several different approaches to present the results of the FOT. After the presentation of these posters, they were analysed and discussed and the following recommendations resulted:

- Keep it simple, even if the results are complex
- Go directly to the main results
- Concentrate on things you can really prove
- Attract attention by graphics
- Visualise
- Graphs are good for expert public
- Question: how do you show small differences?

The stakeholder’s point of view

After Lars Tysklind gave his presentation about the point of view of politicians, a discussion with Roland Schäfer and Tom Alkim followed, who represent the point of view of one OEM and of an employee of a ministry for traffic and water engineering. The main points of the presentation of Lars Tysklind and the following discussion are mentioned below:

- Scientific facts, easy to communicate
- Insight in the users’ behaviour and behavioural adaptation
- Directions for deployment
- The role of public opinion
- Priorities in spending public funds
- To use results: maybe legislation, standards, but also incentives

Experiences and good practice on dissemination and publicity

Dissemination activities should be conducted by means of:

- TV, video clips
- Local/national dissemination is very important
- Joint events, but beware of visibility
- Showcases

- Role-model drivers:
- more awareness, also on related issues
- media attention
- public acceptance
- Demonstration car
- The right messenger e.g. local champion
- Informal dissemination
- Long term dissemination strategy

Recommendation on dissemination activities were given in terms of:

- Positive experiences in euroFOT, TeleFOT, Drive C2X and CityMobil
- What do you want to achieve with dissemination?
- Different sites, different stories, dissemination should be adaptable
- Good dissemination may lead to getting more participants (organisations) on board
- Political debate may have different effects (on implementation and image), both positive and negative
- Need to have a communication plan
- Be open about the project, even when things go wrong
- Know your opponents

Small group exercise: drafting a press release on an outcome of a FOT

The exercise given to the participants was to write a press release based on information of a finished project. They should try to write this press release without the help of any tools only by means of brainstorming and discussion and summarise the main points.

Afterwards, all four press releases, written by the groups, were discussed and compared to the official press release of the project.

Conclusions and wrap-up

Yvonne Barnard presented the wrap-up of the seminar and closed the day.

The headline results from the participant's evaluation forms were that this event scored highly in terms of usefulness; expectations having being met and in terms of satisfaction with the venue and seminar organisation.

5 Seminar 3: The FESTA methodology for newcomers

5.1 Topics

This special seminar was designed for people who are new to Field Operational Tests.

The seminar specified several topics including:

- Context, function selection and use cases
- Research questions, hypotheses and performance indicators
- Study design, measure, sensors and data collection
- FOTIP and how to use the FESTA handbook
- Stories from FOTs
- Ethical and legal issues
- Databases and data analysis
- Analysis of research questions and hypotheses and systems and functions
- Socio-economic impact assessment

5.2 The agenda

The two-day seminar was held on 09-10 May 2012 in Pisa, Italy, in collaboration with Laboratorio Nazionale di Reti Fotoniche (LNRF), CNIT and Istituto di Tecnologie della Comunicazione dell'Informazione e della Percezione (TeCIP), Scuola Superiore Sant'Anna.

The agenda was as follows:

1. Welcome at LNRF/TeCIP by Paolo Pagano (CNIT)
2. Introduction to FOT-Net by Irina Silva (ERTICO)
3. Introduction to FESTA by Yvonne Barnard (University of Leeds)
4. Visit facilities
5. Context, function selection and use cases by Stig Franzen (Chalmers University)
6. Research questions, hypotheses and performance indicators, exercise in small groups by Oliver Carsten (University of Leeds)
7. Study design, measure, sensors and data collection by Oliver Sawade (FOKUS)
8. FOTIP and how to use the FESTA handbook by Roberto Brignolo (CRF)
9. Stories from FOTs and question time by speakers from different projects
10. Ethical and legal issues by Yvonne Barnard (University of Leeds)
11. Databases and data analysis by Andreas Pütz (IKA) and Rosa Blanco (CTAG)

12. Analysis of research questions and hypotheses and systems and functions, Small group exercise by Oliver Carsten (University of Leeds)
13. Visit facilities
14. Socio-economic impact assessment by Eline Jonkers (TNO) and Tom Alkim (RWS)
15. Questions, conclusions, wrap-up

5.3 Summary and conclusions

There were 28 participants.

Participants were welcomed at CNIT by Paolo Pagano, who gave a presentation on the activities at CNIT. Irina Silva (ERTICO), as the project manager of FOT-Net, introduced the FOT-Net project. Yvonne Barnard (University of Leeds) explained the background of the FESTA methodology and introduced the so-called FESTA-V (see Figure 2).

Visit to research facilities

The Institute of Communication, Information and Perception Technologies (TeCIP) of the Scuola Superiore Sant'Anna (SSSA) in Pisa, was established in 2001 as a Centre of Excellence by the Italian University Education Ministry; the institute is co-located with the National Laboratory of Photonic Networks (LNRF) of the Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT). The two institutions signed up a long term agreement to jointly carry on research and development in the telecommunications domain.

Research and training addresses information, communication, and perception technologies, focusing on computer applications and computer systems for embedded real-time systems; real-time wireless networks; sensor and vehicular networks; the study, design and construction of communication networks with partial or total use of photonic technologies; the use of photonic technologies in sensors and in bio-photonics; and virtual environments and robotic systems as interfaces for the study of human-computer interactions and human perception.

The participants from the FOT-Net collaboration were guided through the research labs of the institute. Two live demos have been shown, one focusing on V2I communication, the other one primarily focusing on V2V.

The first demo was introduced by Dr. Paolo Pagano (CNIT), leader of the Real-Time Networks team deeply involved in R&D and standardization activities in the domain of Intelligent Transport Systems.

In the demo a "smart" car equipped with an On-Board Unit, fully developed at the institute, having a wireless IEEE802.11a network adapter and a CAN adapter was seen exchanging information available from the CAN bus with an ITS managing the access to a Congestion Charge Zone (CCZ) and monitoring the traffic status in real-time:

- in the first exercise switching from the red to the green light in a semaphore was demonstrated - depending on the fuel type of the approaching car (green cars allowed, polluting cars stopped); the semaphore is driven by a low-power embedded system fully developed at the institute and implementing the 6LowPAN (IETF RFC 4919 / 6282) communication stack.

- In the second exercise messages coming from the Service and Control Room (and retrieved from low-power RSUs) were demonstrated being directly displayed on the car dashboard informing the driver about the status of traffic in the surroundings.

The demo follows the approach of the Internet of Things so that messages were exchanged by two RESTful applications (hosted on the OBUs, RSUs, and Service and Control Rooms) by means of HTTP or COAP messages.

The second demo was introduced by prof. Ernesto Ciaramella (SSSA), leading the Optical Systems team. A point-to-point wireless communication system, making use of light in the visible band, was set-up between two embedded boards (the same used in the first demo), at a distance of around 10 metres.

The transmitter was equipped with a common LED (Light Emitting Diode) and the receiver was a common photo-diode. The transmitter and receiver also included focusing / defocusing lenses; it has been shown that a seamless communication link with low error rate can be easily established (up to 30 meters, in the shown configuration).

The communication link worked at 114 Kbit/s, but could provide much higher rates, i.e. up to Mbps. In selected configurations, the same team demonstrated a maximum throughput of 1 Gbps, by exploiting complex communication solutions.

The system is being presented at VANET symposia as a promising technology enabling for V2X (primarily V2V) prompt communication, thus eligible for safety-critical applications.

Context, function selection and use cases, Stig Franzen, Chalmers University

After briefly introducing the TeleFOT project, Stig Franzen went on to give an overview of the first step of the FESTA methodology: the context, function selection and use cases. The context defines the limitations and boundary conditions, e.g. the infrastructural requirements. FESTA covers 3 platforms: in vehicle, nomadic and cooperative systems – including all the hardware and software therein. Cooperative systems differ from two other platforms in that there are currently no V2V or V2I systems on the market.

Regarding function, it was pointed out that the combination of functions could be an issue and it is not at all clear how the effects can be disentangled. A definition of a use case, situation and scenario were given. A use case defines the boundary for investigation of how a function works. A scenario is defined as a use case in a specific situation, for instance, a weather condition. It was recommended that different situations be considered for the same use case.

During the discussion round, questions were raised about the consideration of smart phone applications in TeleFot. TeleFOT did not consider apps when defining functionalities because the functions were agreed before smartphone apps took off. TeleFot is also assessing end user behaviour towards function rather than the technical aspects. There was a statement that there is too much emphasis on V2V in cooperative systems. The audience broadly agreed and attributed this to the fact cooperative systems have been pushed by the OEMs. TeleFOT is different to most other FOTs in that it is dealing with infrastructure to platform.

Research questions, hypothesis and performance indicators, Oliver Carsten and Yvonne Barnard, University of Leeds

When defining the research questions, there is a need to consider stakeholder issues (policy, economy, etc), cost-benefit analysis (producer cost, consumer cost, societal cost), what is the usage of system (some not aware that they have the system) and how well is it accepted. The hypothesis should consider a whole range of effects to help answer the research question, including indirect effects of the system on the user (behavioural adaptation), indirect effects of the system on non-users (non-users may imitate the user), interaction between users and non-users (such as pedestrians and cyclists), etc. The levels of driving tasks need to be considered: strategic (e.g., modifying route/mode choice); tactical (e.g. interacting with other road users) and control (e.g. changing speed choice).

Once the hypotheses have been established, the performance indicators need to be defined, i.e. the types of measurements to be taken to test hypothesis). Performance Indicators can be objective or subjective. In terms of driving subjects, there is a need to consider mediating factors (experience, attitudes, etc). The FOT should also consider short-term and long-term effects as well as system design effect.

During the discussion round, a question was raised about the applicability of FESTA for non-vehicle modes and multimodality generally. Although FESTA was developed with the driving function in mind, it can be used for other modes but may need to be adapted. Within the Molecules project (a CIP project on electromobility), the contribution of electromobility to the entire transport system must be investigated and FESTA must be used for this purpose.

Exercise in small groups

Results from the small group exercise

Use case: ADAS: Land departure warning that works when white lining is poor		
Research question	**Hypothesis**	**Performance Indicator**
1. Does the system improve safety?	1.1. Decrease in n° of unintended lane excursions	1.1.1. No of unintended lance excursions
	1.2. Increase in driving when tired	1.2.1. Tiredness using eye recognition and steering wheel
	1.3. Increase in n° of unintended lane excursions when white lining is poor	1.3.1. No of lane excursions with poor lines 1.3.2. No of lane excursions with good lines
2. Does it improve traffic efficiency	2.1. Decrease in number of lane excursions	2.1.1. No of lane excursions

Use case: Cooperative: Cooperative system warning for shockwaves on the motorway up to 4km ahead		
Research question	**Hypothesis**	**Performance Indicator**
1. Does the system improve safety?	1.1. System reduces number of serious incidents	1.1.1. No of fatalities 1.1.2. No of crashes
	1.2. Length of shockwaves is reduced	1.2.1. No of cars affected by shockwave 1.2.2. Shockwave duration
2. Does the system improve traffic efficiency?	2.1. Traffic flow is improved	2.1.1. No of cars per time 2.1.2. Average speed
	2.2. Smoothing/reducing speed variations	2.2.1. Speed distribution
3. Does the system have an environmental impact?	3.1. Lower carbon emissions	3.1.1. CO2 emissions 3.1.2. Air pollution
	3.2. Lower noise emissions	3.2.1. Variation of noise 3.2.2. Absolute noise level

A discussion followed about the difficulty in calculating fatalities because FOTs tend to involve just a few hundred vehicles and the risk of an accident happening within the FOT is therefore remote. In the UK, for instance, the risk of becoming injured in an accident is one injury in 70 years of driving. It was proposed that a better indicator could be the number of jerks. Researchers may also need to clearly show how the hypotheses are related to the research question. Some stakeholders may well wish to receive scientific evidence of the link between the hypothesis and the research question.

Use case: In-vehicle emissions management system		
Research question	**Hypothesis**	**Performance Indicator**
1. Does the system reduce emissions?	1.1. The system reduces emissions	CO2 emissions (fuel consumption)
	1.2. There is a saving difference depending on fuel type	
2. Is the system accepted by users	2.1. The drivers will not be annoyed because the HMI is well designed 2.2. The drivers without the system will not be annoyed	User acceptance
3. Does the system affect the driver style when the system is off?	3.1. The driver will learn how to drive efficiently even without the system	Comparison between initial and final fuel consumption without the system

The discussion considered the performance indicator relating to the comparison between with the system and without the system, notably how easy or difficult is it to calculate this performance indicator would need to consider traffic conditions.

Use case: Nomadic device: find and book parking places for disabled drivers		
Research question	**Hypothesis**	**Performance Indicator**
1. Does the system improve the users mobility	1a. The system will reduce the mean time to the destination	1a1. Mean time to the destination 1a2. Average speed
	1b. The system will increase the usage of vehicles for disabled drivers	1b1. Number of drivers using the vehicles per day
2. Does the system improve the environment by reducing pollution	2a. By adopting the system, the fuel consumption will reduce	2a1. Fuel consumption per vehicle
3. Adoption	3a. Disabled driver used the system ordinarily	3a1. Percentage of disabled drivers using the system ordinarily

There followed a discussion about the increase in mobility leading to an overall environmental deterioration. Clearly, there is a trade-off between mobility and environment, between enabling disabled people to lead more active lives and an increase in vehicle emissions. Studies show that there is an increase in mental illness when people stop driving.

Study design, measure, sensors and data collection Oliver Sawade, FOKUS (Fraunhofer)

The study design encompasses a number of tasks including establishing the frequency of events (how often the function will be triggered), statistical significance (how often does it need to trigger to be relevant) and statistical relevance. Once these have been established, the fleet size can be defined as well as the duration and number of events needed in order to have statistically valid results. This process is known as the power analysis. Multiplying the number of events by the frequency of events gives an indication of the required fleet size and test duration, i.e., the sample size.

Next, the method of testing will have to be selected: naturalistic, semi-controlled or controlled. The nature of the test will depend on the function to be tested. Next the type of measurements to be made (in order to calculate the PI) must be defined (e.g. CAN, loops, roadside sensors, and indirect data such as average speed) as well as the sensors: OBU, CAN, GPS, IMU, C2X, traffic data, weather data). Data must be collected in a unified way for all sensors. The communication network for transferring vehicle data must also be considered (e.g. USB, Wi-Fi, 3G/cellular, or after FOT). All the above factors influence one another and have cross dependencies. Once they have been determined, the budget and data collection framework can then be defined.

To illustrate this important step in the FESTA methodology, Oliver Sawade presented some real-life examples from the DRIVE C2X project. V2V functions are not so easy to test in a FOT because so few cars are equipped and the chance of two equipped cars meeting is very low, even if the application itself could be used frequently (e.g. once per week).

During the discussion session, a comment from the audience was made about the importance of including qualitative data and not to restrict data collection to simple number crunching. Tools for collecting qualitative data include questionnaires, user attitudes surveys, etc. This is neglected in FESTA but is very important.

A question was raised about consideration of error in data collection and whether guidance on this is available within the FOT-Net tool box. There is a need to check that data is delivered properly and that there are no problems with the vehicle. simTD developed something for this but it is not open-source at the moment (PRESERVE has already requested to use it). Yvonne Barnard reminded the audience that there is a FOT-Net Working Group on tools in FOTs and one of its main tasks is to compile an inventory of existing tools within the FOTs. Concerning tools, especially questionnaires, there is a need to consider certified foreign language versions. For instance, TeleFOT test sites together make up 7 languages; it first produces the questionnaire in English, then translates it to the foreign language and then has it re-translated back to English to make sure it has been properly translated. Pilot groups are also set up to test the questionnaires. TeleFOT used a web-based questionnaire, which is considered the way for the future.

FOTIP and how to use the handbook, Roberto Brignola, CRF

An introduction to the FOTIP (the FESTA handbook) was given along with the different formats in which it can be read. The session included a live demonstration of navigating the FESTA handbook on the FOT-Net Wiki. This method of reading the FESTA handbook is very useful because it the text contains hyperlinks.

FOTIP does not just address the technical steps in implementing a FOT; it also covers other essential elements such as listing the main staff and skills required for a FOT. The staff are more than just the research team, it also includes the legal and ethical advisors, accounting/auditing etc. FOTIP provides an activity example, listing tasks, sub-tasks and which team members should be involved.

Stories from FOTs and question time

This session involved anecdotes from partners of various FOT projects.

Ethical and legal issues, Yvonne Barnard, University of Leeds

FOT partners should be aware of ethical and legal matters and not just leave them to the lawyers. They play a role throughout the FOT cycle. The FESTA handbook lists the main ethical and legal topics, such as participant recruitment and agreement. However, it is not easy to give standard advice because the rules and laws change from one country to the next.

The main principle behind ethics is that the beneficiary will gain a positive benefit or experience from being part of the test. A risk assessment could be considered, especially for what concerns safety. There is a need to consider the limitations of a system and make sure that the subject is properly aware of this. Regarding data privacy, there are laws and technical and organisational means to guarantee privacy, however, it is currently impossible to completely anonymise data. Technical options have been tried in Italy by mixing in raw data. In Japan, data from the first and last part of a trip have been left out. Consent to use data could be sought from the subject. The important issue is not so much about recording drivers, but recording the other vehicle users and people outside of the car (for instance, in the case of a video pointing outward to monitor traffic). Even if the driver consent has been obtained, this is not the case for the others. Regarding the other vehicle occupants, it was proposed to put warning stickers on the dashboard and advise the driver to inform the other occupants. This measure needs to be checked with European lawyers; it is not possible in USA.

The issue of data ownership also needs to be addressed. Who owns the data: the driver, data gatherers, FOT consortium? Can a research colleague use the data for other research purposes? These are just some of the questions that must be addressed. Regarding CANbus data, vehicle manufacturers are not always keen to relinquish it. Other issues that would need to be addressed concern the release of data to the authorities in specific circumstances. For instance, in the case of an accident, the police or insurance companies may well ask for data. It is important to note that drivers are not obliged to cooperate actively in their own conviction. What happens in case of system failure, e.g. a driver is caught speeding because the system failed to inform the driver and he/she had overlooked the roadside speed limit sign. In this case, the driver is ultimately responsible but may well complain to the system supplier.

Databases and data analysis, Andreas Putz, IKA and Moises Rial, CTAG

Andreas Putz presented the data analysis process experience of euroFOT and Moises Rial presented this from the perspective of the SISCOGA project. Data analysis is intrinsically linked to the hypothesis and answering the research questions. The performance indicator is a comparison measure of before and after. In the discussion, it was agreed that there is a need for a model to translate safety indicators into hypothesis. How to combine some safety indicators, e.g. speed and headway indicators are relatively unknown.

Question session (all topics)

Q1. Why the form of a V for FESTA?

A. It allows you to look at the correspondence between the inputs and outputs. There is a resemblance with the approach taken in systems engineering – relationship between left and right hand side. It is also allows to make links between different levels. The audience was encouraged to use version 4 of the V, which talks about users and participants rather than drivers and vehicles.

Q2. How applicable is FESTA to multimodal transport?

A. TeleFOT proves that the FESTA methodology is wider than car-based systems. The new CIP pilot project Molecules (ICT and electromobility) will provide insight on this as it has to apply FESTA. With multimodal transport, the use of subjective data becomes more important. There was agreement that it will be more complex. Molecules is considering using FOT-Net Wiki for reporting back on progress. The prospect of a FESTA workshop for the CIP projects was also considered.

Q3. Is it true that less congestions means less fuel consumption?

A. There was a discussion about short-term effects and long-term impacts. Less congestion may mean less fuel use in the short term but it would also probably lead to more cars on the road.

Q4. Is there a template to define the use cases?

A. No but there are templates for performance indicators and other tasks.

Q5. How to make the step from hypothesis testing to impact assessment?

A. Hypothesis testing is straightforward (yes or no). Impact assessment considers wider implications of a result (e.g. speed reduction – how will it affect rest of the system).

Exercise on analysis of research question, hypotheses and PIs, Oliver Carsten, University of Leeds

This was once again a group task. The groups were all given the same task. They were presented with a set of hypothetical results on the impacts of a system that warned main-road drivers on rural roads to slow down on the approach to intersections. The presented results indicated not much change in mean speeds, generally significant reductions in 85th percentile speeds, but an increase in observed incidents per month. One group concentrated on the incidents, but found (correctly) that the change was non-significant. The second group placed more reliance on the incidents than on the speed data, while the third group concluded the opposite. This allowed a discussion about the reliability of data with a large number of observations (speed) as compared to a small number of observations (incidents). It also allowed for a discussion of why a system might be targeted mainly at high speeders and therefore not affect more cautious drivers.

The exercise was as follows:

The system

A function provides speed warnings to main-road drivers on rural roads when approaching intersections. The warning is “Approaching intersection! Reduce your speed to x km/h!” where x is 5 km/h below the speed limit.

Research Question

Does the function improve safety?

Hypotheses

Hypothesis 1

The function will lead to greater awareness of driving too fast because drivers will be warned about inappropriate speed.

Hypothesis 2

Because drivers are more aware of appropriate speed, they will have fewer serious incidents at rural intersections when they are driving on the major (main) road.

Experimental design

32 vehicles
First 2 months of driving without support
Then 4 months of driving with support

Speed Data from the FOT

Table 2: Changes in mean speed

Speed limit	Baseline km/h	System km/h	p value
70	60.75	59.64	<.05
80	69.35	68.70	0.16
90	74.43	73.85	0.88

Table 3: Changes in 85th percentile speed

Speed limit	Baseline km/h	System km/h	p value

70	74.91	71.55	<.01
80	85.02	82.04	<.01
90	90.54	89.56	0.66

Observed serious incidents at rural intersections (all speed limits)

Before period: 47
After period: 110
Note that the number of incidents follows a Poisson process.

Exercise task

Make an assessment of whether there has been an improvement in safety and a reduced accident risk with the system.

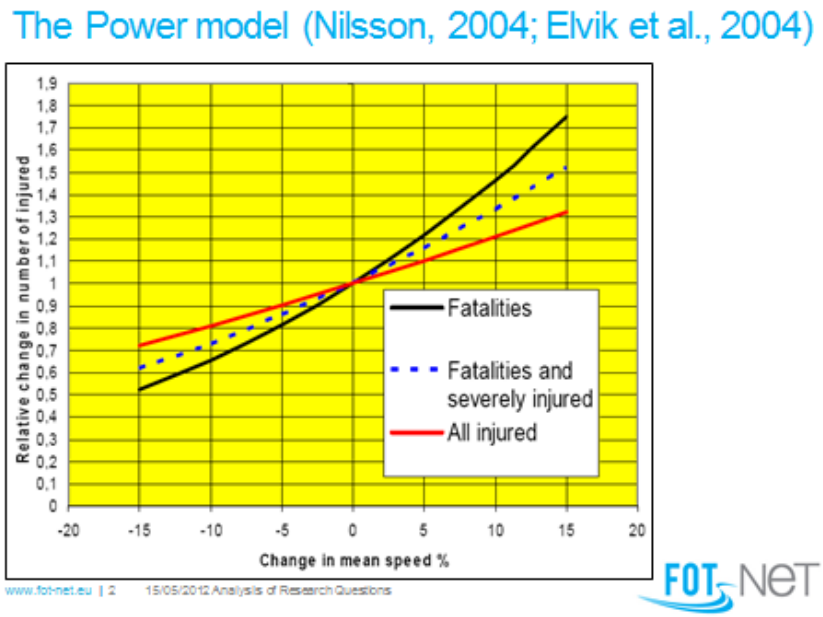

Figure 4: The Power Model

Socio-Economic Impact Assessment, Eline Jonkers, TNO, and Tom Alkim, RWS

Tom Alkim and Eline Jonkers discussed the socio-economic impact assessment both from the point of view of the researcher (Eline) and the client (Tom). The clients are usually the EU and public parties. It is important to understand what the client wants and what are they looking for. The decision to deploy is a big one which requires as much information as possible. Make the link between the theory and the practice. Use the FOT to raise awareness is also a reason to do a FOT. Some challenges are: the client wants to know how trustworthy the results are, and politicians may think that the systems will come to the market anyway so they may be of the opinion they don't need to take any action. In the discussion a suggestion was made to add the proposed values to monitor effects in the Wiki. It was noted that the public opinion is important, politicians often follow what is said in the press. Also the political climate plays a role, politicians may want to look favourable in the eyes of the public opinion.

One of the lessons is the involvement of stakeholders. The presentation started from the view of the stakeholders. Some ministries may not want to involve stakeholders during the process but if they are open it is a good way to raise awareness. See for example the DRIVE C2X events, open to all during the FOT. Not just invite stakeholders are the beginning and at the end of the FOT. Field trips are a good way to convince and obtain feedback.

Conclusions and wrap up

Participants were positive about the seminar, and the reception at CNIT. Some of the remarks:

- It was nice to start from the lower level. Learned a lot (more that I thought I would) since I didn't know so much about the right ride of the V.
- I missed a bit about assessment of subjective data. Subjective data is import and for deployment decisions, opinions are important.
- A suggestion was made that the results from subjective data may be plugged into the scaling up phase. For example, there are some interesting results from the ISA FOT, a survey sampled a representative population of UK drivers, 2000 households. 1/3 of people opposed and 1/3 said don't like it but if necessary they would go with it. And 1/3 were positive. Although the survey results were good, the ministry said that only 1/3 were for it.
- We need to study more intermodal transportation. If we could apply FESTA to these it would be interesting. How difficult would it be? Try to extend the focus of FESTA to plan, run and analyse results from intermodal systems.
- It was nice to have the sharing of stories at the end of the session.
- FESTA is focus on FOTs , you should think about systems that are mature. If you try to apply it to prototypal stage, it is more difficult, as with cooperative systems. You have to modulate the FOT in a more controlled way. In the last version of the handbook we have tried to address these contradictions.
- The question was raised when do you decide to go into real life conditions? Some answers are that FOT cannot cover everything and it also depends on the system that you are addressing. Some of the systems cannot be studied in test tracks
- No reference to tools and technologies used by the FOTs were given during the seminar. I would like to have some basic knowledge about the telecommunications tools used in FOT. It was remarked that FOT-Net has a dedicated workpackage on tools, and the review of a large variety tools is becoming available on the FOT-Net wiki.
- It was a good first step into FESTA. CIP projects will be involved in FOT-Net to share outcomes.
- I have used FESTA, but it was useful to have a live presentation. Would like to have more exercises and longer. Also useful for people who are already using FESTA.
- Will politicians use what we are finding? How to influence their thinking.
- We can continue to do FOTs as long as we want. When shall we stop doing FOTs? It was remarked that in the case of ISA a lot has been done already, but we can continue to do research.
- We need to spend more money improving the tools we are using in the FOTs.
- I appreciated the work in the small groups.

The headline results from the participant's evaluation forms were that the venue and organisation at Pisa had been very well received and that 100% of participants had found the event useful.

6 Seminar 4: Complementarity of different FOTs and re-use of data

6.1 Topics

The seminar specified several topics including:

- euroFOT and TeleFOT: how their results and methods contrast from and complement each other
- Combining some results from euroFOT and TeleFOT
- Complementarity of cooperative systems projects
- Practical experiences from (re-)using data from Naturalistic Driving and FOT data sets
- European view on data sharing
- Requirements for data re-use and challenges and opportunities for combining results and sharing data

6.2 The agenda

The seminar took place on 26th November 2012, the eve of the final event of TeleFOT (27-28 November 2012) in Brussels.

The agenda was as follows:

1. Introduction to FOT-Net and FESTA by Yvonne Barnard (University of Leeds)
2. Presentations from euroFOT and TeleFOT on how their results and methods contrast from and complement each other by Steven Reed (University of Loughborough)
3. Exercise in small groups, combining some results from euroFOT and TeleFOT, facilitated by Ruth Welsh, Andrew Morris and Steven Reed (University of Loughborough)
4. Conclusions and discussion of the results of the small group discussions
5. Presentation on the complementarity of cooperative systems projects:
   - simTD and DRIVE C2X by Rosa Blanco (CTAG) on behalf of Oliver Sawade (FOKUS) who was absent due to illness
   - SISCOGA by Rosa Blanco (CTAG)
   - SCORE@F by Cécile Barbier (Renault)
   - FOTsis by Emilio Cacheiro (OHL Concesiones)
   - Summary and comparison of the needs and available knowledge from these projects by Rosa Blanco (CTAG)
6. Presentations on practical experiences from (re-)using data from Naturalistic Driving and FOT data sets, facilitated by Helena Gellerman (SAFER):
   - Jordanka Kovaceva (VolvoCars / SAFER) on re-using knowledge from SeMiFOT to euroFOT data
   - Astrid Oehme(HFC Human-Factors-Consult GmbH) on re-using naturalistic driving studies data for the Taxonomy of Driver Error project
   - Martijn de Kievit (TNO) on the re-use of Japanese data in ECOSTAND
   - Jordanka Kovaceva (VolvoCars / SAFER) on analysing data from SHRP2

7. European view on data sharing by Colette Maloney (European Commission, head of unit DG CONNECT)
8. Summary of requirements for data re-use and discussion of challenges and opportunities for combining results and sharing data facilitated by Helena Gellerman (SAFER)
9. Conclusions and wrap-up by Yvonne Barnard (University of Leeds)

6.3 Summary and conclusions

There were 27 participants during the day.

Complementarity of results and methods from euroFOT and TeleFOT

Steven Reed (University of Loughborough) presented differences and similarities between the two large European FOTs, euoFOT and TeleFOT, which are now finished. An extensive comparison was made of the main elements of the tests, such as participating drivers, cars, locations, miles driven, study design, systems and functions tested, types of data and the way in which they were analysed.

Next to the comparison (which can be found in his presentation on the FOT-Net website), several experiences from the projects were discussed. Sometimes only limited samples of drivers could be used for testing a hypothesis, due to the choice to have more different types of research questions, vehicles types and other factors. Having a standard baseline was also a problem, drivers may already have different systems in their vehicle and are used to driving with them. A baseline without systems being active would be a step back for them. Recruitment proved to be difficult; it was not always possible to have a representative sample of the driver population.

Exercise in small groups

In three small groups, participants next looked into the complementarity of the two projects themselves. Andrew Morris (University of Loughborough) first made an inventory of possible research questions. It was decided to focus on questions about fuel saved, number of fatalities avoided, driver distraction, willingness to pay and travel time reduction.

The exercise was as follows:

> *What you have on the tables is a very brief outline of 3 separate but hypothetical studies conducted in Spain, Finland and Germany.*
> *There is information included on:*
> - *Type and numbers of vehicles and drivers*
> - *The area type*
> - *What functions were tested*
> - *The durations of the trial*
> - *What types of data was collected*
> - *And what the study type was*
>
> *From this we would like you all – in groups of 4 or 5 depending on how you split up – to identify what research questions on the screen above you could answer with this information, what ones you couldn't answer and what you're unsure about.*
> *For each research question you tackle we would also like you to identify what bits of the data you would use to achieve this, what exclusions you have made and what assumptions you might have made.*

		SPAIN			FINLAND			GERMANY		
										
Vehicle type		Car	PTW		Car	Bus		Car	Truck	PTW
Number of vehicles		50	50		25	30		100	20	50
Area		National	Madrid area		Helsinki area	Helsinki area		National	National	National
Functions tested	1	Navigation	Navigation		Navigation	FEA		Navigation	Navigation	Navigation
	2	FEA	-		FCW	-		FCW	BLIS	FEA
	3	-	-		ACC	-		ACC	FEA	-
	4	-	-		FEA	-		FEA	-	-
Individually or bundle		Individual	Individual		Individual	Individual		Bundle	Bundle	Individual
Duration of trial		6 months (per function)	1 year		3 months (per function)	1 year		1 year	1 year	6 months (per function)
Duration of baseline		1 month	1 month		4 months	1 month		1 month	1 month	1 month
Q's	1	Driver background questionnaire	Driver background questionnaire		Driver background questionnaire	Driver background questionnaire		Driver background questionnaire	Driver background questionnaire	Driver background questionnaire
	2	Travel diary	Travel diary		Travel diary	-		Travel diary	Travel diary	Travel diary
Data type	1	GPS	GPS		GPS	GPS		GPS	GPS	GPS
	2	CAN	-		CAN	Fuel usage records		CAN	CAN	Fuel usage records
	3	Video	-		-	-		Video	-	-
	4	eye tracker	-		-	-		-	-	-
Driver ages		25-65	17-25		25-85	45-52		25-65	32-60	45-65
Driver type		private	private		private	Professional		private	Professional	private
Design		Within subjects	Within subjects		Between Subjects	Within subjects		Within subjects	Within subjects	Within subjects

Figure 5: Three hypothetical studies

Participants presented their results. They found it easy to study questions such as travel times, but reduction in accidents or fatalities was much more difficult. Some found willingness to pay also difficult, especially since 'apps' are now available free of charge. Distraction can be studied by video, but that is not an easy task. One of the conclusions was that you cannot really compare general research questions, but you can compare specific ones such as the influence of the use of systems/functions on speed behaviour. It was remarked that there is a difference between "comparison" and "complementarity", the latter concept may be better when we look at very different studies. To facilitate complementarity, one group stated that they would like to see standardised test-scenarios, for example a "green traffic light wave" scenario. There is a role for naturalistic driving studies in providing general (European-wide) baselines, although baselines may need to vary in different FOTs. In order to share data, you need to understand them, and have standardised meta-data.

Ruth Welsh (University of Loughborough) summarised the conclusions from the presentation and discussions:

- Comparing and Complementarity of different FOTs is often possible but caveats are essential, and it is challenging.
- Opportunities exist for results from EuroFOT and TeleFOT to be combined and for them to complement each other.
- Combined data can give a broader picture – cover more functions / wider geographical area / greater diversity of participants – and helps to start to build the European picture.
- Complimentary data can give more robust statistical results.
- Harmonised data collection, at least at fundamental level, may reduce caveats applied.
- Awareness of issues for future national studies through FOT-Net.
- It would be good if a common data specification could be defined, maybe as part of FESTA.
- FOTS need to make use of the FESTA handbook and follow the advice. The research community needs to make use of the tools available.
- Meta Data are required – the MS Excel sheet used in the exercise gives you the numbers but not how they were derived.
- There is a need to look beyond the basic description of tests and data.
- Test design must set a clear and representative baseline and clear and representative treatment phase.
- There is a difference between common specification for some research questions and specific data for other research questions. Targeted research questions would maybe be easier.
- Researchers want to bring something new, resulting in diverse FOTs.
- A question to be addressed is 'how do we publish the results in order that they can be combined / compared?'.
- FOTS need to move with the times, it is appropriate to repeat the same tests with next generation technology / DAS

Complementarity of cooperative systems projects

In this session, speakers from several cooperative system FOTs answered three questions:

- Overview of the project
- What can the project bring to other FOTs?

- What does the project need from other projects?

Rosa Blanco (CTAG) presented the slides on simTF on behalf of Oliver Sawade (FOKUS) who was absent due to illness and DRIVE C2X; SISCOGA was presented by Rosa Blanco (CTAG); SCORE@F was presented by Cécile Barbier (Renault) and FOTsis was presented by Emilio Cacheiro (OHL Concesiones).

Projects, especially the finished ones, provide their learning and experiences on the methodology, organisation of tests and tools used in the project. They are aware of the need to further analyse the large amount of data they are collecting. They emphasize the importance of learning from each other and passing on the lessons-learned. Standardization and interoperability are key issues for all projects. More can be learned about the use of cooperative systems by having access to data from other countries, different driving environments and other types of vehicle and driver.

The projects together aim to promote cooperative driving and the deployment of successful systems and functions. Collaboration on dissemination of results is therefore also seen as a requirement. Working on common architectures and business models is another important aspect.

Rosa Blanco (CTAG) summarized the conclusions, and made a comparison between the five projects (available in her presentation slides via the FOT-Net website):

Projects can bring:

- Experience in FOT preparation and execution
- Raw data and evaluation results
- Contribution to standardization
- The equipped area

Projects need:

- The ones still in earlier stages need the experience from the others in terms of FOT preparation, execution and evaluation
- Similar data collection and opportunity for comparison of results
- Collaboration in standardization and deployment of the systems
- Re-using and disseminating results

Data re-use and sharing

Practical experiences from (re-)using data from Naturalistic Driving and FOT data sets

The three speakers were asked to address the following topics:

Context:

- Purpose for re-using the data
- Short description of data and identified databases

Accessing the data:

- Procedure specified by data provider for access to the data set; education, agreements, data request specification, etc.
- Access possibilities; download, access at data provider
- Financial agreements
- Access tools and analysis tools

Analysis:

- Ease of understanding the data
- Support; technical, data content and extraction, education

Lessons learned

Jordanka Kovaceva (Volvo Cars / SAFER) presented her experiences in re-using knowledge from SeMiFOT to euroFOT data. Previous knowledge is required to know what data to ask for and use in your analysis. Her conclusions were especially focused on the need for explicit information about the data and tools used. The quality of the data, precision and accuracy (for the research purpose) is crucial. Knowledge of available database and measures is needed, as well as an accurate definition of the data requested. Tools, procedures, methods may become (and need to become) more formalized and harmonized when they are used by more researchers. Funding models also need to be established to keep large datasets accessible also after the projects have completed.

Having access to FOT-data from other countries will bring more interesting results.

Astrid Oehme (HFC Human-Factors-Consult GmbH) discussed her experiences with re-using naturalistic driving studies data for the Taxonomy of Driver Error project, in which taxonomy of faulty actions while driving was developed as a base for the derivation of support requirements for driver assistance systems. One of the major problems she encountered was to find the right contact person for relevant projects, as people move between companies and authors of deliverables are not always easy to trace. When she found the FOT-Net Wiki, relevant information was easier to find.

The process of data re-use was also not easy, there are formal procedures and costs, information and manuals may be missing and, for example, video analysis can often only be done in the country where the data were collected.

Analysis of the 100-car study data was made easy by the friendly technical support offered by VTTI, they have their data available on the VTTI-website with a Matlab-routine for data access, and data description manuals. Also the PROLOGUE data were used, the video-data could be seen on-site, but a proprietary video player was needed to do so. Excellent technical and content-related support was available as well as training in the data analysis programme. One of the lessons-learned was that transparent data formats are important as well as access to raw data. Another was that you need to start the process of getting data access almost before the actual project starts, as it takes much longer than expected, due to lack of procedures, contact persons etc.

Martijn de Kievit (TNO) explained his work on the re-use of Japanese data in the ECOSTAND taskforce, sharing the Komozawa dataset and the Dutch Rij-Assistent dataset.

He also emphasized the need for good meta-data to understand the dataset. Maintenance of large datasets is a major issue, as well as support for data-access and analysis services.

Jordanka Kovaceva (Volvo Cars / SAFER) gave an overview of the procedures that had to be followed to get data from SHRP2 (US Second Strategic Highway Research Program), on a contract SAFER has gained to analyse part of their naturalistic driving data.

Perspective of the European Commission

Colette Maloney (European Commission) addressed the need for data sharing. In Europe it is of the utmost importance that doing business is sustainable and decisions are evidence-based. To realise these goals there is a strong need for data. Use, and re-use, of data forms the basis for the realisation of new services and applications. Another strong requirement is to enhance accountability and transparency of publicly funded projects, data-sharing is an important element in this.

However, data-sharing has many challenges; it is not simple to use data that were gathered in another context. Issues around ownership, confidentiality and privacy have to be solved. Work is needed on interoperability. Different countries in Europe have different rules on data use, storage and protection. What is also needed is the raising of awareness of the potential of data-sharing.

European policy is promoting 'open data', whereby data from publicly funded projects should be open by default, and only be restricted if there are strong, justifiable reasons. There is currently a call within the cooperative mobility program for a support project on data-sharing.

- To facilitate data sharing actions are needed in the areas of:
- Meta-data and machine-readable formats
- New research based on cooperative mobility data
- Public data platforms
- Tools to analyse, upload and store data
- Collaboration with other regions in the world
- Guidelines for data-sharing

The Commission appreciates receiving feedback on how to achieve these and other actions in order to facilitate data sharing.

In the discussion, participants stressed the need for funding for projects that do (re-)analysis of data instead of gathering new data. The commission would like to receive ideas about this. Again the need for standardization of data-sets was emphasized; this could be a role for the support action. Privacy and confidentiality are seen as major issues. Participants felt strongly about being given opportunities to do more analyses on the huge amount of legacy data gathered in projects that are now finished.

Discussion on data-sharing

Helena Gellerman (SAFER) presented the outcomes of the discussions so far within the FOT-Net Data Sharing Working Group. She presented the different data types and the guiding principles that are necessary for reliable data sharing. One of the key words is to create Trust; in data, in the handling of the data and between persons. The foreseen International Data Sharing Platform consists of procedures, templates and "standard requirements" and a catalogue of available datasets. This does NOT include the data itself, which should remain in the original storage location, close to the people have the basic

knowledge and understanding of that data. The main challenges are the international scale - with different funding schemes, IPR and legal rules, and the efforts needed to create and maintain such a platform, both in resources and funding. The main factors for a successful data sharing platform are financing of data handling after the projects have finished; making the platform attractive for data providers and the deployment of a common data description.

Helena led the discussion on data re-use and sharing. Questions that were posed are:

- Which data is most interesting for you?
- What could be achieved if we start sharing our data sets?
- How can we facilitate for data providers?
- How can datasets be financed after the project has ended?
- How should access to video be handled?
- How could access to/use of data from multiple data providers in a project be facilitated?
- How should support and education given by data providers be set-up?
- How can projects in the early project phases be persuaded to consider sharing data after the project?

(Questions 1, 2 and 4 in particular, were discussed).

Concerning the financial aspects, datasets need to be maintained and there are significant costs associated with that, as well as for providing support for researchers who want to re-use data. This could be made into a project of its own, spanning over a longer time period. A standard business plan for providing support may be helpful for projects who want to share their data. Another idea was to develop a “data warehouse” model. A non-profit organisation could be set up to serve as a warehouse and to market and promote the use of its data, having a clear business model.

Data that are seen by participants as the most interesting are:

- Data from other countries
- Data that are well-documented
- Questionnaire data. As there are language problems, it may be an idea to have a student exchange network, who look into the data-sets in their native language
- Video, or at least video-clips, to fully understand what actually happens in the driving situation.

Finally, the confident answer to the question as to what could be achieved by data sharing was that much value could result from:

- Avoiding re-doing data collection
- Being able to do meta-analyses, not looking only at specific systems and being able to generalize outcomes
- Discussions between researchers could be greatly enhanced, leading to the building of a much stronger research community
- Understanding of results between countries
- Consequent sharing of other things than just data
- Creation of trust between organisations, between research institutes and industry
- Starting new research from a higher level
- Interaction with international partners such as US and Japan
- Good material for comparisons between specific groups in different contexts and countries , e.g. older drivers

- Providing justification for performing FOTs, emphasizing that there is access to a wide range of data.

Together, these achievements would also save a lot of money.

Conclusions and wrap up

As a wrap up, Yvonne Barnard (University of Leeds) presented some short conclusions of the day. In short, three elements are most needed:

- Cooperation
- Standardization, e.g. of baselines, business models, data, questionnaires, recruitment, reporting, scenarios and tools
- Support

If these elements are in place, complementarity of projects will be realised, sharing will take place and last but not least, stakeholders will be more satisfied.

The headline results from the participant's evaluation forms were that the Brussels venue and organisation proved to be the most popular of the seminar series overall and that 100% of participants had found the event useful.

7 Extra seminar: FESTA and impact analysis for CIP pilot projects

7.1 Topics

This additional seminar within the FOT-Net programme on the subject of "FESTA and Impact Analysis for CIP projects" was arranged to provide an opportunity for those active in FOTs (Field Operational Tests) and in the CIP (Competitive and Innovation Framework Programme) pilot projects to come together to see how each other are handling the issue of 'Impact Analysis' - and through this, identify transferable best practice. It provided a platform for delegate to receive progress updates on the CIP pilots and importantly, provided the forum for an examination of the current FESTA methodology and its applicability in impact assessment. It also provided a valuable opportunity for networking across the various projects.

The four CIP projects are MOLECULES[4], SmartCEM[5], ICT4EVEU[6] and MOBI.Europe[7], which are required to implement the FESTA methodology. This seminar was designed to provide an opportunity for those active in FOTs and CIP pilots to share their experience and identify transferable best practice.

The seminar specified several topics including:

- Standardisation in the approach to Impact Analysis
- Impact analysis and examples performed in FOTs
- CIP pilots and their approaches to evaluation
- FESTA methodology, and the applicability for the pilots for evaluation and impact assessment
- Evaluation methods in the pilots, especially for answering research questions
- Plans and approaches on impact assessment and scaling up in the pilots
- Issues with impact analysis

7.2 The agenda

On 4-5 April 2012, an additional seminar was held in Barcelona, Spain, on the FESTA methodology and impact analysis for CIP pilot projects.

The agenda was as follows:

Day 1:

1 Setting out the challenge: How do we achieve some standardisation in the approach to Impact Analysis? - Rene Kelpin (DLR)

[4] http://www.molecules-project.eu/
[5] http://www.smartcem-project.eu/
[6] http://www.ict4eveu.eu/
[7] http://www.mobieurope.eu/

2 FOT-Net introduction - Yvonne Barnard (ERTICO, University of Leeds)
3 “What is Impact?” Introduction to impact analysis and examples performed in FOTs - Eline Jonkers (TNO)
4 Introduction to CIP pilots and their approaches to evaluation - CIP representatives
5 FESTA methodology, and discussions with special regard to applicability for the pilots for evaluation and impact assessment - Eline Jonkers (TNO) and Rene Kelpin (DLR)
6 Evaluation methods in the pilots, especially for answering research questions with group discussion - CIP representatives
7 Day – 1 Summing Up - Yvonne Barnard (ERTICO, University of Leeds)

Day 2:

1 Recap of Day-1 outcomes - Rene Kelpin (DLR)
2 Plans and approaches on impact assessment and scaling up in the pilots - CIP representatives
3 Discussion and/or small group work on issues with impact analysis (e.g. barriers/challenges) - All
4 Conclusions and wrap-up - Yvonne Barnard (ERTICO, University of Leeds)

7.3 Summary and conclusions

There were 15 seminar participants

Participants were welcomed by Yvonne Barnard who briefly explained that this would be an interactive working seminar through which FOT-Net aimed to facilitate the sharing of learning and expertise and make progress in exploring how the FOTs and Pilots could learn from each other and work more closely in future. As such, it was hoped that through this seminar not only would the CIP pilots be able to learn from the FESTA methodology developed for the FOTs but that there might also be knowledge transfer from the pilot to the FOTs. The diagram below was thought to be particularly helpful in illustrating that in fact, rather than being seen as independent processes, FOTs and pilots should be seen as sitting alongside each other in the continuum of research through to deployment.

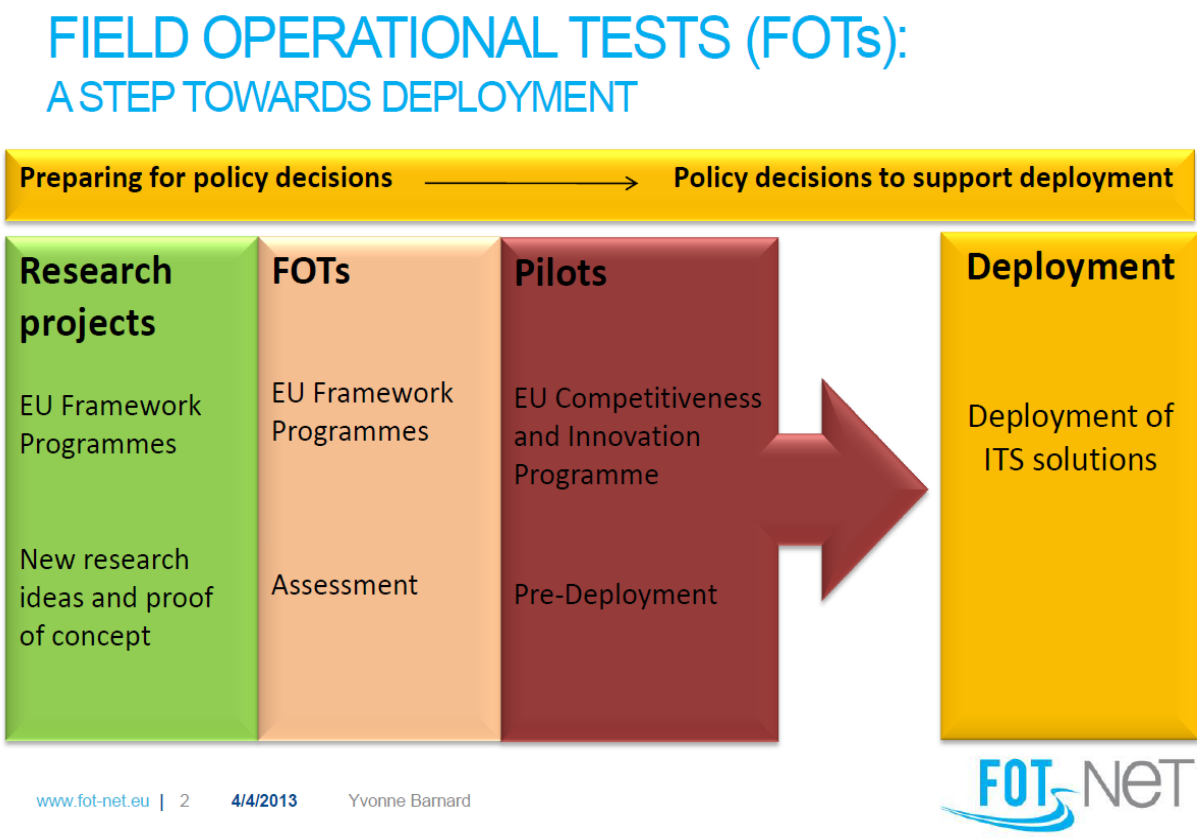

Figure 6: FOTs and Pilots

Setting out the challenge: How do we achieve some standardisation in the approach to Impact Analysis? - Rene Kelpin (DLR)

Rene described how, after starting in the MOLECULES project in January 2012 and undertaking evaluation without the benefit of FESTA, attending the "FESTA for Beginners" workshop in Pisa had first suggested to him that FESTA could help with problems with Impact Assessment within the pilots. Rene continued to explain how the FESTA methodology could be applicable even if it might need to be adapted for the pilot projects. Rene stressed that FESTA must continue to be maintained at least until the end of the pilot projects (end of 2014). From this session, he was hoping to compile problems and issues being faced by pilots (and FOTs) as well as to identify who could help to solve them and to have responsibilities assigned to take things forward. He suggested that the EU needed to be urged to give further assistance on a number of open problems but that FOT-Net and the Expert User Groups could also undoubtedly help. Yvonne Barnard reminded the group that the outcomes of this seminar would feed into the FESTA revision workshop in the autumn.

FOT-Net introduction - Yvonne Barnard (ERTICO, University of Leeds)

Yvonne described that FOT-Net is a support action (now in its second phase – FOT-Net2) to bring people and projects together via a range of mechanisms including stakeholder meeting and seminars, the maintenance and update of the FESTA handbook, the development of an inventory of tools and through other dissemination activities (including the website and Wiki).

The main mission of FOT-Net is the formation of a community sharing experience and expertise. This community is international across Europe but is extending beyond Europe (especially through involvement with the United States and Japan).

FOT-Net comprises 5 working groups:

- Data Analysis
- Events and incident definition
- Ethical and legal issues
- Impact assessment and scaling up
- Data sharing

(with an additional work package on tools for FOTs).

FESTA is a methodology developed for FOTs to introduce a systematic interdisciplinary approach and a shared common language to enable different tests to be compared and 'real' answers developed. Yvonne stressed that FESTA is a methodology NOT a doctrine, and as such it is living and moving and continually gathering and incorporating lessons learned. For this reason, closer collaboration with and feedback from the pilots is expected to be mutually beneficial.

"What is Impact?" Introduction to impact analysis and examples performed in FOTs - Eline Jonkers (TNO)

Eline described 'impact' on drivers, travellers, and society as well as on transport networks and operations and posed the question "why do an impact assessment and why is it worth deploying"? and answered that it enables research questions to be answered and provides input to scaling up and cost-benefit analysis. Doing an impact assessment is a complex piece of research and there are numerous challenges. It is very important to have clear research questions and usable hypotheses. Installing technology in many sites or in many vehicles and data processing and logging takes a lot of time. In addition there can be situational variables such as weather conditions and the day, time of year that have an impact on results. Eline's advice was that although Impact Analysis takes place at the end of the project, it needs to be set up very early on in the project. She further advised that it is essential to log explanatory data (metadata) alongside e.g. CAN bus data to enable meaningful interpretation and explanation later on and to log reasons for abnormal readings (such as weather, holidays etc.).

This presentation prompted a number of questions about user-acceptance / qualitative data and guidance on questionnaire design. It would be good if an inventory of subjective tools such as questionnaires and travel diaries would be available, as well as guidelines how to use them. The FOT-Net work package on Tools will add these types of tools to the Wiki in the coming period.

Introduction to CIP pilots and their approaches to evaluation - CIP representatives

MOLECULES (Rene Kelpin, DLR) http://www.molecules-project.eu/

'MOLECULES' is a pilot of smart connected electro mobility based upon integrated transport sharing schemes in Paris, Berlin and Barcelona (project running January 2012 to December 2014). MOLECULES aims to calculate the expected impact of Electro Mobility on global gas emissions, however a relatively small number of vehicles are involved in the study within the

three participating cities with the intention of scaling-up results initially to European level. The biggest question for MOLECULES is therefore scaling up.

SmartCEM (Txomin Rodriguez, TECNALIA) http://www.smartcem-project.eu/

The objective of SmartCEM is to prove that user-acceptance of electric vehicles can be increased by 15% and evaluate how much transport efficiency can be improved. The project (involving 28 companies from 4 countries, working on 4 pilot sites) is developing tools, identifying barriers and supporting pan-European interoperability. Txomin explained that the pilot is in many ways similar to MOLECULES, with the main distinction being that SmartCEM will enable users to drop-off their shared vehicles anywhere. Rene added however that in MOLECULES, non-station based (flexible) car sharing will be applied. SmartCEM have adopted the FESTA methodology but grouped the components into 3 stages: Definition, Evaluation, and Deployment.

ICT4EVEU http://www.ict4eveu.eu/

This pilot makes use of inter-connected infrastructures (charging points, control centres and vehicles) including roaming and charging. Problems encountered include the fact that there can be numerous electricity suppliers within one city (as is the case in one of the pilot cities, Bristol). ICT4EVEU represents a different type of pilot from the first two examples, yet it is expected to share a methodology with them.

MOBI.Europe http://www.mobieurope.eu/

This pilot is based around the concept of a cloud of ITC applications associated with Electro Mobility aimed at delivering a more reliable and efficient end-to-end energy system. The project aims to establish the management interface between the EV infrastructure and the electric grid.

FESTA methodology, and discussions with special regard to applicability for the pilots for evaluation and impact assessment - Eline Jonkers (TNO) and Rene Kelpin (DLR)

Eline described the process of data collection and analysis to test hypotheses and from this, the process of 'scaling up' to develop national/global results that can be applied elsewhere. She went on to list the problems encountered in scaling up detailed local data from micro to macro level – including taking account of situational variables (e.g. local driver behaviour and the effect of different junction types, seasonal variables such as weather and holiday periods).

euroFOT used a direct method to scale up delays measured in the FOTs and on a micro-network by mileage for each road type on the overall road network. Such an approach has advantages that it works well for local effects and requires little effort, but has the disadvantages that it is quite rough, a lot of data is required to scale up meaningfully and if the local network structure is not typical, then it will be misleading to scale up results from it.

A key question from follow-on discussion was "is it possible to re-create city-level total figures by extrapolating from sample data"? If not, then there will be no point in scaling up data from pilot studies.

Rene Kelpin described how the intention of the MOLECULES project is to develop tools for Impact Analysis (by contrast, MOBI.Europe does not even have an evaluation work package as part of their project). MOLECULES have produced their initial set of performance indicators though they have a problem of combining objective and subjective measures and applying a scale-up to a city/region and even European level based on those combined measures– especially when virtually all indicators are derived or self-reported rather than directly measureable.

Evaluation methods in the pilots, especially for answering research questions with group discussion - CIP representatives

The four CIP pilot projects collaborate through an 'Expert Working Group' which provides a common high-level set of performance indicators (see table) and is leading to a convergence of methods.

Table 4: A common high-level set of performance indicators used in the four CIP pilot projects

Evaluation category	Indicator title	Type of indicator	Type of data	Required measures	Type of measure
ENVIRON-MENT	CO_2 Emission reduction	Objective	Quantitative	Charging time, Charging duration	Direct
				Energy mix , Charging process	Derived
				Charging Volume	Derived
				Aggregated road mileage performance	Derived
TRANSPORT & MOBILITY	Modal share[2]	Subjective	Qualitative	Share of ICE car trips replaced by EV	Self reported
	Penetration rate[3]	Objective	Quantitative	Number of incorporated EV	Derived
USER UPTAKE	User acceptance	Subjective	Qualitative	Ease of use, Satisfaction, Usefulness, Trust, Compliance, ...	Self reported
	Willingness to pay	Subjective	Qualitative	Willing to pay	Self reported
	User awareness	Subjective	Qualitative	Knowledge	Self reported
				Usage	Self reported
ECONOMY	Roaming of charging and clearing[4]	Objective	Quantitative	Number of roamed charging and clearing processes	Derived

Txomin Rodriquez took the group through a step-wise presentation of the adaptation of FESTA which had been developed and applied by the SmartCEM project.

In the Q&A session that followed, Anita Toni stressed that concrete results are required by stakeholders once a project is at pilot stage and that failure is not acceptable.

Erik Thomasson pointed to the need for more emphasis upon post-deployment evaluation – i.e. did an intervention work as expected, if not why? if better than expected, why?

Day 1 Summing Up - Yvonne Barnard (ERTICO, University of Leeds)

Though not a doctrine, people are benefiting from FESTA. FESTA itself continues to evolve and contributions from this workshop will feed into the review and update of the handbook later in the year. Other issues raised have included:

- **Scaling up**
- **User-needs evaluation**
- **Subjective data**
- **Is the methodology any good for cooperative systems?**

  - FESTA was not originally developed for this, but in the last revision of the handbook, cooperative systems were taken into account

- **How to handle negative results**
  - How to communicate these to stakeholders? Can other secondary benefits be found?
  - Emphasis should be put on the lessons learned
  - Justify why it may have failed
  - Discuss results with experts globally, and in European working groups
  - Even if the impact question cannot be answered, FOTs might give answers on the drivers' opinion about comfort and usability
  - Managing expectations

- **Research versus deployment**
  - What do we want to find out? This is always the first question to be asked
  - Pilots are less about research, but on a path towards deployment
  - If a project is research oriented, we have to accept that results are unknown
  - Not just technical but also socio-economic research
  - Simulation may be a helpful tool
  - Evaluations are needed after deployment (are things actually getting better/worse)
  - Rebound effects – unintended negative consequences of actions
  - Think about impact from the beginning
  - Is the social pace of change out-stripping the tests?

- **PI and data issues**
  - Need additional data to be able to scale up
  - Results from a FOT or pilot may be open issues and new questions to be investigated
  - Significance of findings? Scaling up assumes that results are sufficiently reliable
  - Transferability of results (e.g. the transport fleet may be very different in the pilot study area to a second city where the results might be applied)
  - Calculation of emissions factors (general versus local)
  - User acceptance
  - Interpretation of results
  - Baselines for comparison, find information about the situation in a city or region from other sources
  - External CBA elements such as the increased costs of developing new vehicles or the assumed cost of energy generation for EVs
  - We should also think about the re-bound effect, unintended effects may be negative, for example users change from walking to using an electric vehicle

- **Need to convey common strategic messages to the EC from the FOTs and pilots.**

Day 2: Group work on solutions

Plans and approaches on impact assessment and scaling up in the pilots - CIP representatives

Discussion and/or small group work on issues with impact analysis (e.g. barriers/challenges) - All

Workshop participants split into small groups which were tasked with the following exercise:

- Classify and analyse problems
- Think of a specific example from one of your projects
- Identify the 'type of solution

- Solution can be found
- More study needed
- Expert help required
- Update to FESTA required
- No solution possible
- If possible, identify alternative solutions

One group covered each of the following four topics: Scaling Up, User Acceptance, Data Interpretation and Strategic Issues.

Group 1. Scaling up

It is important to find factors from insight in the user behaviour that will help deployment and promotion strategies. Comparable cities/regions need to be found. There is often a lot of useful information to be found in public sources that may give an insight in the factors that are (or not) comparable.

A key message from the FOTS is “be specific about your scaling up” because not everywhere is the same, therefore projects should identify a number of city comparison parameters through which comparable cities across the EU can be identified where results might be most meaningfully applied – the more you match up the ‘city comparison parameters’, the closer your city can be assumed to be and the more likely that research findings could be shared. It was suggested in discussions that perhaps commercial marketing companies might have an index of similar cities which could be used by projects to find similar cities for comparison.

An overall challenge however remains that of statistical significance and how representative the unavoidably small samples of data derived from FOTs or Pilots can be and whether results can be reliably scaled up to city-level (let alone to national level or beyond). For example, projects take place involving small groups of users and at a local scale but we are seeking to assess EU-level impact. FOT-Net offered to continue to be an ally for CIPs in finding and sharing solutions.

Group 2. User Acceptance

Measuring user acceptance is seen as a particular issue for the CIPs, as is also being able to use standardised methods in order to make comparisons. The CIPs are currently coordinating their efforts in this area. FOT-Net offered to be of help if needed, and such a common questionnaire and user acceptance indicators would also be of benefit to the rest of the FOT community.

Questionnaires on user acceptance may not only address end-users (drivers) but also fleet-operators. Incentives for filling questionnaires was also seen as an area where further discussions and collaboration is needed in order to establish best practise and ensure good response rates without the results being skewed.

A problem that has been encountered is the translation of questionnaires; some questions do not mean the same in different countries and languages. It would be nice to have a European database of questionnaires. The main problem was seen as being the fact that user acceptance standards are still virtually non-existent and there is an absence of definitions and measurable comparable standards.

For example, with indicators the values used differ widely – for example with sometimes a high-score being 'best' whilst in another a score of 1 is best.

Questionnaires are often poorly designed and use inherently biased scales, such as scales that offer the respondent the opportunity for more positive than negative responses (rather that equal positive and negative responses around a neutral response in the middle).

The CIPS are building a matrix/table of a common user acceptance questionnaire that they each cover to assist one another in finding good practise. The global set of user acceptance questionnaire items is to be used as a tool box for tailoring pilot's surveys with mandatory and optional elements.

Molecules also presented their work on a proposed comprehensive survey which incorporates learning from many other studies.

- Some areas for general further guidance included:
- Should there/can there be a common agreed questionnaire structure?
- Can a compendium of standard questions be developed?
- How can the respondent best be motivated to complete a survey / participate in a project (in an un-biased way)?
- When is best to gather the information / ask the questions (to get a full and accurate response)?

Group 3. Data interpretation

Problems and solutions identified were:

The baseline: (i.e. what are you comparing?) this has to be taken care of in the project study design. As for electro mobility as a quite new kind of mobility, comparable base line scenarios have to be found or defined.

It is not always easy to find reliable and official statistics about a region/city: It was suggested that the solution would be a local, regional and European-level investigation as more study is needed. It was suggested for example that it might be possible for FOTs to use commercially available 'geo-demographic' lifestyle data (such as produced for the UK by companies such as Acxiom, CACI and Experian) to build up a segmented profile of the population. This would need further evaluation.

Finding the proper test design: Bias in the data was one example where data experts can control for bias by removing extreme values from the data that would otherwise bias or skew the findings. Other methodologies such as regression, analysis of variance (ANOVA) and principal components analysis might be used more widely to distil the main factors out of complex data on a user population. The suggested solution was to incorporate more input from specialist experts / statisticians and that FOT-Net or EWG could help to identify them.

Group 4. Strategic Issues

A number of strategic problems were listed by this group with specific reference to electric vehicle roll-out – these included: transferability, interoperability, penetration and cost. One

problem discussed was that of 'transferability' with projects studying the same things doing it in different ways so that no useful information could be transferred.

In terms of interoperability, there are strategic problems with electric vehicles due to there being no one clearing-house for power supply and multiple electricity suppliers (Barcelona has attempted to assist in this respect by at least providing the energy free to their EV project). Interoperability is another problem for EV projects as there are no universal connectors across and between cities and plugs and voltages vary too, meaning they can only be used in certain localities.

Another strategic issue, linked to costs - was seen to be 'political' with there being a risk that once a city authority had invested money (and reputation) in a pilot it may find it politically difficult to admit it has not succeeded and reconsider another solution. It was suggested therefore that this risk can be mitigated by getting free market investment in infrastructure to minimise public costs.

The group noted that current travel behaviour is that people tend to use public transport locally far more within cities, but use more energy in-efficient private transport for long-distance inter-city transport due to such problems and the consequent inconvenience.

Some suggested solutions included:

- Greater collaboration amongst projects with a message from this group to the EC to make greater collaboration and clustering of projects a condition of future funding
- Involvement of city authorities and decision-makers
- Setting up demo projects using publically funded fleets
- Involving the free market through inducements (such as subsidised power costs)
- Incentivisation of EV use (through tax and/or exclusion zones for non-EV traffic)
- Greater promotion and public awareness raising

Conclusions and wrap-up - Yvonne Barnard (ERTICO, University of Leeds)

Yvonne concluded that despite some initial concern that FOT-Net might not have been able to assist the pilots through this workshop it seemed that progress had been made and together we are moving closer to the real world by moving from FOTs to pilots. The pilots clearly have developed a lot of valuable knowledge which will be incorporated back into the FESTA methodology through the review of the handbook later in the year.

Some summary quotes from delegates included:

- "I like these open and active discussions – they have given me fresh hope!"
- "Has been an opportunity to learn more and assist with knowledge transfer between pilots and FOTs – I have been impressed by your common working"
- "I would have liked more time for open discussions – we should continue discussions online"
- "It's reassuring to know others are having problems too!"
- "projects are sometimes (too) small, it is good to be able to take advantage of the experiences of other projects"
- "A message to the EC should be that it's about the journey (the learning process), not just the outcome"

- “We now have to re-arrange everything – my project will hate me!”
- “Not enough time but I have been impressed by the depth and breadth of discussions”
- “FOT-Net is no longer a myth – now need to work out how best to take advantage of the results and experiences of other projects”.

The headline result from the participant’s evaluation forms was that despite the event having focused on CIP Pilot projects rather than FOTs, the audience were clearly very appreciative of the aim to transfer knowledge, with 100% of participants rating the experience Very Good or Good across all sessions.

8 Seminar 5: Tools for gathering and analysing data, especially in FOTs of cooperative systems

8.1 Topics

After several FOTs have been successfully performed, the FESTA methodology is seen to be well accepted and used. During the course of these FOTs different kinds of data was recorded, stored and analysed. FOTs for cooperative systems are still ongoing, and these face particular challenges - especially data collection, data transfer and management, as well as data analysis, since in FOTs for cooperative systems, participants need to collect data at the same place and point of time and match this data in the analysis process.

The seminar specified several topics including:

- Overview of tools for data gathering and analysis in FOTs
- Tools for data gathering in different FOTS
- Tools used in experimental design and test execution
- Tools for data analysis for cooperative system FOTs
- Tools for data analysis for cooperative system FOTs
- Experiences and good practice on tools for gathering and analysing data

8.2 The agenda

On 25 April 2013, a seminar was held in Berlin, Germany, on Tools for gathering and analysing data, especially in FOTs of cooperative systems.

The agenda was as follows:

1 Introduction - Adrian Zlocki (IKA)

2 Overview on tools for data gathering and analysis in FOTs - Adrian Zlocki (IKA)

3 Tools for data gathering in different FOTS (15 min each) - Moderator: Yvonne Barnard (ERTICO) Speakers: Mohamed Benmimoun (IKA), James Lenard (Loughborough University), Horst Rechner (FOKUS), and Fabian Utesch (DLR)

   a. euroFOT (e.g. CAN and camera data)
   b. TeleFOT (e.g. driver data)
   c. DRIVE C2X (e.g. cooperative data)
   d. National FOTs (e.g. independent logging platform)

4 Tools used in experimental design and test execution- Oliver Sawade (FOKUS)

5 Tools for data analysis for cooperative system FOTs (DRIVE C2X) - Bart Netten (TNO)

6 Tools for data analysis for cooperative system FOTs (FOTSIS) - Emilio Cacheiro (OHL Concesiones)

7 Experiences and good practice on tools for gathering and analysing data:

a. Introduction - Adrian Zlocki (IKA)
b. FESTA approach - Oliver Sawade (FOKUS)
c. Data gathering issues - Moisés Rial Martínez (CTAG)
d. Data analysis issues - James Lenard (Loughborough University)

8 Discussion on experiences with data gathering and analysis tools: Lessons learned and recommendations - Adrian Zlocki (IKA)

9 Conclusions and wrap-up – Yvonne Barnard (ERTICO)

8.3 Summary and conclusions

There were 26 seminar participants.

Overview on tools for data gathering and analysis in FOTs - Adrian Zlocki (IKA)

Adrian explained how the objective of WP5 ('Tools for FOTs') in the FOTNET project is to look at the tools utilized in existing FOTs and to make an inventory of these tools. His presentation took the group through the process he has been engaged in:

- Establishing an Inventory List for FOT Tools
- Identification of responsible persons for different FOTs
- Data collection
- Contact with manufacturers
- Presentation of results (wiki)

Adrian explained how the tools had been clustered into 8 categories and that to date, details of 83 tools had been made available on-line. He also demonstrated how this information has been structured and how it can be accessed via the FOT-Net wiki (www.wiki.fot-net.eu)

Tools for data gathering in different FOTS

Moderator: Yvonne Barnard (ERTICO)

Speakers: Mohamed Benmimoun (IKA), James Lenard (Loughborough University), Horst Rechner (FOKUS) and Fabian Utesch (DLR)

Mohamed Benmimoun gave a comprehensive presentation on the euroFOT project (May 2008 to June 2012) which used CAN and camera data from test sites in Sweden, Germany, France and Italy. It undertook an assessment of impacts of ADAS in real traffic and produced a cost-benefit analysis, based on results from this impact assessment. Mohamed described in detail the processes and systems used and how the process had adhered to the FESTA methodology.

James Lenard provided a presentational overview of the **TeleFOT** project – a European project based on Detailed Field Operational Trials (DFOTs) and Large Scale Field Operational Trials (LFOTs) across 8 countries involving approx 2,600 subjects over 10 million kilometres. A number of nomadic devices and functions were tested for the impact areas: Safety, Mobility, Efficiency, Environment and User uptake. A key research question was "Does the device cause distraction?" James illustrated the instrumentation used and the results and outcomes of the study.

Horst Rechner's presentation described the 6-month national FOT simTD as part of the **DRIVE C2X** project (undertaken in the Frankfurt/Main area of Germany) and the tools it had developed for data gathering and handling. Horst described the project with illustrations and process diagrams and identified best practice in automation and data quality which had been derived.

Fabian Utesch described the independent logging platform developed by DLR for their pilot Naturalistic Driving Study (NDS). The motivation for this study was to enable research into critical situations and accidents through observation of normal driving behaviour. Challenges included; easy installation and removal of Data Acquisition System (DAS); universal application in different vehicles; management of extensive amount of data. His presentation described the data process and illustrated the solution developed for data acquisition. He concluded that the project had successfully established a NDS data infrastructure; effective implementation of existing experiment based workflow, vehicle independent DAS solution and a secure server infrastructure for remote analysis access.

A few questions were asked in the end of this session such as:

- How was ADAS data processed and uploaded automatically?
- How would the eye-tracking device in TeleFOT cause distraction to driving?
- How could data quality be checked early on and automate validation for quality assurance be conducted?

Tools used in experimental design and test execution- Oliver Sawade (FOKUS)

Oliver described the potential difficulty adhering consistently to the FESTA methodology especially when numerous groups of people can be involved at different stages of a project. He used a number of project examples and demos and concluded that best practice should ensure that there is:

- A dedicated tool-chain accompanying the FESTA process (to avoid import/export situations and to keep coherence)
- Operationalization from Hypothesis to Study design using Scenarios and Test cases
- Monitoring and test control in real time during the test

Questions from the meeting:

- How much manual effort is needed to monitor whether drivers operate the system correctly? Quite some effort is needed for trained operators to monitor drivers and to correct them if something goes wrong. Naturalistic driving studies are easier in that sense because drivers cannot do anything wrong (except with the recording equipment).
- Is there any Application Programming Interface (API) for different FOT tools? Not as such, there is an adaptation in individual projects, although some tools are generic.

Tools for data analysis for cooperative system FOTs (DRIVE C2X) - Bart Netten (TNO)

Bart provided an update on DRIVE C2X and in particular, the approach taken to data analysis. His conclusions were that DriveC2X:

- Has identified 2 approaches to data analysis: Technical and Impact evaluation

- Has established that detailed analysis is necessary of technical issues and data quality
- Suggests that data processing should be automated for immediate feedback on the success of a test, and details on inconsistencies in (interactions between) components
- Has developed data analysis tools that are independent of specific log format, use standard databases and tools and are configurable for different test sites and projects

Tools for data analysis for cooperative system FOTs (FOTsis) - Emilio Cacheiro (OHL Concesiones)

Emilio explained that FOTsis is a large-scale field test of a set of close-to-market Cooperative Services, in order to assess their effectiveness and their potential for a full-scale deployment in European roads. FOTsis works across nine test sites in four EU countries (Spain, Portugal, Germany and Greece). Its main objective is to test the infrastructure's capability to provide Cooperative Services in several experimental environments throughout Europe (these are Emergency Management, Safety Incident Management, Intelligent Congestion Control, Dynamic Route Planning, Special Vehicle Tracking, Advanced Enforcement and Infrastructure Safety Assessment).

Emilio provided a detailed overview of the project and in particular for the purposes of this seminar, the data analysis tools. Specific data issues covered included data *handling* and data *analysis* within FOTsis.

Questions from the meeting:

- Is there a joint effort in analysis tools from FOTsis and DRIVEC2X? No, there is not, FOTsis started from scratch, the joint effort was more on the technical site, but is would be good if the projects would work together in the evaluation.
- The problem was discussed that sensors are have to produce the data are not always synchronized, also the units in which measurements are recorded are not always the same. This makes comparing measurements between test-sites difficult.

Experiences and good practice on tools for gathering and analysing data

Adrian Zlocki introduced the fact that dedicated FOT-Net Working Groups (WGs) look into a specific set of issues to further enhance and revise the FESTA methodology for FOTs. There is a specific WG for Data Analysis and the main outcome has been a list of recommendations for data analysis issues. Adrian introduced in turn, three speakers who presented on their experiences:

Oliver Sawade stressed "talking data" - "before thinking *how*, think about *what* and *where from*". His contribution also included a useful list of do's and don'ts:

- Make sure you start measurement collection early (but don't forget versioning/reverse compatibility of log definitions!)
- Think about data transfer and how choosing a method will affect the study design
- Never delete log data on the source before it is safe on the redundant server storage
- If drivers are involved, the logging system has to be bulletproof and dead simple to operate
- Think about adding live monitoring

Moisés Rial Martinez summarised lessons learned from participating in a number of projects:

- Data requirements and specifications are the first step and should be done very detailed
- Pilot testing of the whole technical chain is really critical and takes time
- It is essential to use a common framework
- Be prepared for unexpected issues. It is important to implement a daily control with specific operation indicators to assure that the FOT and their different elements in the technical chain are running as expected
- Questionnaires should be also automated and included in the loop
- Data analysis is a very demanding task

James Lenard's key points for the discussions and conclusions were:

- Quality control and data validation required during experimental trials or with minimal delay
- Caution where eye-tracker measures different parameters using (somewhat) independent methods
- Systematic investigation of eye-tracking with progressive introduction of disruptive factors

Discussion on experience with data gathering and analysis tools: Lessons Learned and recommendations - Adrian Zlocki (IKA)

Adrian introduced a discussion session which focused on: Experimental design, Data collection, Data processing, Data analysis, and other topics. Examples of relevant issues for discussion included:

Data acquisition

- Selection of data to be collected for Performance Indicators
- Method of data collection
- Choice of data acquisition systems

Database

- Maintenance of data after the end of a project
- Restrictions on access to OEM proprietary data
- Data synchronization
- Protection against data loss

Data analysis

- Large data-sets
- Video analysis
- Detection of driver behaviour issues such as distraction

Other

- Privacy issues
- Process automation

- Link between data acquisition and data analysis

Based on the introduction, question and answers were raised with regards to lessons learned and recommendations. Discussion topics were on the DLR platform in terms of driver influence by installed measurement equipment and experience with uninfluenced drivers. At this stage the system is not yet evaluated. Furthermore the overall topic of piloting was discussed. The conclusion was that piloting is crucial for the success of a project. Workshops are needed for all the people involved in a project to understand each other's tasks and requirements. Solutions include building some flexibility in the experiment.

From crucial piloting the discussion expanded to risk management of FOT/NDS work. FESTA could be updated in terms of argumentation for piloting: what could go wrong and how to avoid it.

Finally data format and large data sets were discussed. The data format seems to be more important than the tool-chain used. From experience only 10% of data is good for FOTs.

QAs:
Question with regards to the DLR platform (Fabian Utesch):

- Did the subjects drive normally when such a device was installed? Not sure
- Did you provide the car to the driver who can use it whenever they want to use? No

Question with regards to data:

- How many iterations would help? A lot of iterations (3 months and longer). Piloting is a crucial phase. 20ish workshops to refine the experiment. Experts should be there. CTAG piloted 3 months. James (TeleFOT): the Mondeo was used in previous projects, it may not be piloting but introducing. Something like kit faults can cause considerable delay. Workshops are needed for all the people involved in a project to understand each other's tasks and requirements. Solutions include building some flexibility in the experiment.

Conclusions and wrap-up – Yvonne Barnard (ERTICO)

Yvonne summarised conclusions and issues in a presentation she had put together during the day to capture key pits from the day's presentations and discussions.

The group had considered the importance of the process of deciding on tools (top-down, bottom-up) and that it is important to start early with data requirements and specs. The tools required depend on research questions and also differ between technical and impact analysis. Piloting was also considered to be essential – even though it takes time, as were risk analysis and consideration of resources and the re-use of data

The discussion of automation vs. manual data logging recognised the need for quality/sanity checking (as data can be wrong!). Automated safeguards or making the data easy to interpret were highlighted here. Discussions also covered the importance of data synchronisation, interconnection and coherence (for example of data formats) between tools – not least, for data import and export efficiency.

Some other types of tools (other than for data collection and analysis) had also been covered, including: Scenario definition, Subjective driver data, Fleet management, Organisational tools, Project organisation, and Task division.

A final message that neatly captured the range of discussions was:

"Be prepared for the unexpected. Think about complementarily between projects, in tools, in analysis....."

Yvonne closed proceedings by detailing up-coming FOT-Net events; thanking presenters and delegates for their contributions and guiding them to use the project wiki to maximise future engagement (http://wiki.fot-net.eu/).

The headline result from the participant's evaluation forms was that this proved to be the seminar that participants found to have been least useful across the overall series of seminars. That said, 94% stated that the seminar had been at least 'Partly Useful'.

9 Seminar 6: FOT achievements and opportunities for the future

9.1 Topics

The subject for this final seminar was drawn from feedback received throughout the programme of the areas that seminar participants had indicated might benefit most from further consideration. On this basis, it was decided that the seminar of the programme should focus on FOTS that have completed (or who are close to completion) reporting back their achievements at each of the three key stages of the FESTA process (Stage 1. 'Preparing', Stage 2. 'Using' and Stage 3. 'Analysing'). In so doing, the seminar picked up best practice in FOTS as well as further promotion of FESTA.

The seminar specified several topics including:

- Best practices in each of the three stages in the FESTA methodology: Preparing, Using and Analysing
- Lessons learned and needs for practical guidelines
- Outcomes and achievements from FOTS and deployment strategy.
- The future for FOTs and FESTA

9.2 The agenda

On 23 September 2013, this final seminar for FOT-Net 2 was held in Versailles, France.

The agenda was as follows:

1 Introduction and welcome

2 Session 1. Project presentations on best practice in each of the three stages in the FESTA methodology:

   a. FESTA Stage 1 'Preparing' Presentation: DRIVEC2X, Martin Baumann (DLR), Commentator: Oliver Carsten (University of Leeds)

   b. FESTA Stage 2 'Using', Presentation: FOTsis, Jorge Alfonso (Universidad Politecnica de Madrid), Commentator: John-Fredrik Grönvall (Volvo Car Corporation)

   c. FESTA Stage 3 'Analysing', Drive C2X, Oliver Sawade, Adrian Zlocki (IKA), Niels Agerholm (Aalborg University)

3 Session 2. In small groups, Chaired by speakers and commentators. Make inventory of lessons learned and needs for practical guidelines (groups divided over 3 FESTA stages)

4 Session 3. Outcomes and achievements from FOTS and deployment strategy. euroFOT: Mohamed Benmimoun (IKA), TeleFOT: Andrew Morris (Loughborough), Deployment strategy: Tom Alkim (RWS)

5 Session 4. The future for FOTs and FESTA Panel discussion, moderated by: Andrew Morris (Loughborough), Expert panel: Niels Agerholm (Aalborg), Gwenaelle Toulminet (ASFA), Oliver Sawade (FOKUS), Oliver Carsten (Leeds). Questions:

a. What is the future for FOTs?

b. How should the FOT methodology be further developed?

c. What are the challenges for the future?

6 Summing-up, Yvonne Barnard (ERTICO) and Erik Thomasson (University of Leeds).

9.3 Summary and conclusions

There were 22 participants, of whom 36% had already completed their FOT.

Participants were welcomed by Haibo Chen (University of Leeds) who explained that as this was to be the last FOT-Net 2 seminar, it was an important opportunity to exchange knowledge and FOT-Net experiences (the aim of WP4) and feed into the revision of the FESTA methodology that will be taking place in November.

Haibo explained that the format of the seminar was devised to be both informative and challenging, since each presenter was paired with a peer 'commentator' who would comment on the speaker's presentation and lead further discussion - culminating in an expert-panel discussion in the afternoon. An important contribution to learning was hoped to be more 'dirty stories' where participants would be candid about things that had gone wrong or mistakes that had been made within projects in order to pass this learning on to others.

Session 1. Project presentations on best practice in each of the three stages in the FESTA methodology

1a FESTA Stage 1 'Preparing' (Presentation: DRIVE, Martin Baumann - DLR, Commentator: Oliver Carsten – University of Leeds)

Martin Baumann provided an overview of the UDRIVE project which seeks to understand relevant aspects of road safety and efficiency under naturalistic driving conditions and continuous data collection through unobtrusive recording of driver and vehicle parameters. By this process, the development of research questions is an iterative process.

The main goals are:

a) to ensure that relevant data types and datasets are collected

b) to ensure data collection is compatible across study sites in different countries

Naturalistic Driving Studies minimise experimental design and control and instead, are observational studies as behaviour occurs.

Oliver Carsten commented that FOTS generally focus on the mechanism of how changes occur, whereas NDS's are both more open-ended (circular iterative processes) but focus by contrast, on what problems occur and why.

Problems encountered with UDRIVE were that many kinds of instrumental video and audio recording were wanted but this proved very difficult. Other practical problems had included deciding the angle needed for camera recordings and whether this must be different for rural versus urban driving.

Oliver concluded that the revision of the FESTA handbook would need to take into account revised definitions of research questions in order to make it better applicable to Naturalistic Driving Studies.

In the follow-on Q&A, the group was informed that 'Smart Analysis' (Marco Dozza) was a method that is being used to 'chunk' data into time and distance spans for different driving types that enables information to be extracted from the very large datasets collected through NDS (for example, UDRIVE will have collected more than 300 vehicle-years of data by the time of its completion).

In order to compare results between countries, it would be ideal to have the same equipment in all countries as well as the same group of drivers. This can however prove to be difficult because of the penetration of different makes of car in the vehicle fleet of different countries.

1b FESTA Stage 2 'Using' (Presentation: FOTsis, Jorge Alfonso - Universidad Politecnica de Madrid, Commentator: John-Fredrik Grönvall – Volvo Car Corporation)

FOTsis is a large-scale field testing of road infrastructure management systems to undertake a detailed assessment of their potential for wide-scale deployment. FOTsis follows the FESTA methodology throughout, but Jorge's presentation focused on the 'Using' stage of FESTA.

There are 7 FOTsis 'services' operating across 9 sites in Spain, Portugal, Germany and Greece. There is a complex environment with technical and organisational peculiarities that need to be taken into account when addressing any stage of the FESTA process. FOTsis established FOT Plans that translated the theoretical to practical actions. During preparation, issues included data sources, data repositories, main data flows, and data structures and most importantly, data management guidelines. Jorge described that there are a number of risks that may not have been foreseen until now but that risks can be mitigated during execution.

Services are the basis for the acquisition of the data. Data storage has not proved to be critical as the data is event-driven so generally, data is only stored when something happens so data volumes have been manageable. Impact analysis will probably be conducted as a combination of statistical analysis and focus-group studies so questionnaires are being carefully designed.

FOTsis services are infrastructure-side based, with data from road operators, traffic managers etc who have historical ways of storing data to meet their own requirements (which may not be the same as those of the FOT).

John-Fredrik clarified that FOTsis dealt with road infrastructure management systems and that the study mainly involved motorways and toll roads.

He enquired of Jorge, how easy it has been to use FESTA for the FOT Plan. In response, Jorge said that this had not been easy, also because they looked at several impact areas, not only at safety.

On the matter of data sharing issues, Jorge confirmed that data is quality-assured for evaluation using a common evaluation database for all test sites.

1c FESTA Stage 3 'Analysing' (Presentation: Drive C2X, Oliver Sawade - Fraunhofer FOKUS, Commentator: Adrian Zlocki – IKA, additional presentation by Niels Agerholm – Aalborg University)

This joint presentation began by Adrian Zlocki providing an overview of the analysis process through from hypothesis definition through answers. Lessons learned show that many things can go wrong throughout this process.

Lessons learned:

- Take a layered approach
- Check that datasets are feasible for analysis
- Automate analysis if possible
- Analysis of video data is very time consuming
- Real time data synchronisation is essential

Research Needs:

- Need sophisticated models
- Need map-matching technology
- Relevant driver data
- Video analysis
- Common analysis tools
- Standardisation

Oliver Sawade had kindly agreed to stand-in to give the view from Drive C2X. Drive C2X is an umbrella FOT for national projects at 7 sites across Europe evaluating the impact of C2X in driving conditions. Though there are different methods, scale and purpose at individual sites, they are primarily safety focused and have a united technology, goal and standards. Oliver mentioned that TNO have produced a good automated tool for data quality and that the FOT simTD (Germany) have also produced useful factsheets that capture their learning.

Lessons learned:

- There is limited data and some events are just too rare to capture.
- Little things can cause big problems, e.g. different system times (lack of synchronisation) can lead to events being mixed up
- There are lots of errors in the data, quality checks are absolutely vital

Niels Agerholm then presented on the use of FOT data for the identification of hazardous road locations (i.e. where there have been more accidents than would have been expected). The study used 425 vehicles fitted with GPS, accelerator and gyroscopes in order to capture decelerations and 'jerks'. GIS was incorporated to map 'hot-spots' and thereby identify hazardous locations.

Session 2. Inventory of lessons learned (Chaired by commentators and speakers)

Participants worked in groups to list lessons learned and requirements for practical guidelines.

<u>Group 1. Preparation stage:</u>

- Does a FOT require a study of individual driver behaviour? FESTA assumes it does, FOTsis by contrast studies aggregate data?
- Can we plan experiments that deliver more conclusive results, for example aggregating across studies?

- Are we being over-optimistic about what we can detect with studies?
- Are NDS focusing on too many research questions? (e.g. could concentrate just on vulnerable road users)?
- If using video, continuous video is an absolute requirement. In fact, incident-triggered data recording of any kind is not trusted – especially as it gives no information on contributory factors in the period preceding the event
- Governance is very important

Group 2. Using Stage:

- Can we re-use data?
- FOTs need metadata and consistency of data methodologies
- Good metadata is essential – e.g. in some countries the economic crises affected travel data in some test sites – essential that this explanation is captured in the metadata
- EuroFOT and TeleFOT already combine data but it remains debatable whether the data can be compared
- Perhaps you cannot compare sites as local differences are just too great?
- Analysts should be involved from the outset to advise what is needed to enable them to get the results
- There are conflicts between the need for database communications versus privacy and confidentiality
- Need clear data requirements from the outset
- Financial constraints will limit larger FOTS

Group 3. Analysis Stage:

Adrian Zlocki informed the group that the FOT-Net Working Group on Data Analysis had produced an inventory which would be released shortly at the ITS World Congress in Tokyo. He was keen to gather additional ideas to add to this inventory however. Examples raised in this session included:

- Need to plan for analysis from the beginning – analysts need to be involved in the research questions (does the FESTA V methodology diagram reinforce the belief that analysis does not need to be thought of until later in the process?)
- Have open communications throughout the project to manage the expectations of funders – rather than leave the analysts to have to make up for what has gone wrong earlier in the project
- Less is more – focus on a deliverable project
- People can be too fixed on a particular technology
- If not all data are analysed a follow-up project is possible if you have all raw data and good documentation.
- Good practice for data analysis is included in the on-line toolkit
- Who owns the data can be important. A lesson should be to endeavour to ensure that data is publicly owned not by the OEMs.
- There is a trade-off between collecting wide generic data and specific narrow data – focus on few in-depth research questions rather than wide superficial and general

- There could be more collaboration between projects to gather data that would satisfy multiple specific interests
- Analysis is complicated by there being many variables at the time of an event (e.g. was the driver on the phone, if so was it a self-initiated call? Urban or rural area etc)
- Need to get a representative sample of the population however, the worst drivers will most likely not take part
- Could involve the driver better and improve qualitative data collection, e.g. a smart phone applications incorporating an incident button - ask driver after incident to explain incidents in real time.

Session 3. Outcomes and achievements from FOTS and deployment strategy

Mohamed Benmimoun (IKA) described the outcomes and achievements from euroFOT which completed last June. This FOT had benefitted from full access to vehicle data through the involvement of vehicle manufacturers in the project. The project, involving 28 partners had undertaken an assessment of ADAS in real traffic involving around 1,100 drivers of 1,000 vehicles collecting 35million km of data in five study areas (in Sweden, France, Italy and two in Germany). It was the first project to use FESTA (and in some cases to adapt it where guidance was not covered).

Findings showed 16% increase of headways for cars with ACC (Adaptive Cruise Control), a 2% increase in speed and up to 82% reduction in incidents. User-acceptance studies showed a positive acceptance for both ACC and FCW (Forward Collision Warning). For example, 94% of drivers felt that ACC increases safety and 77% felt that it increased comfort.

Andrew Morris (Loughborough University) summarised the findings from TeleFOT – a 54 –month project led by VTT across eight sites and involving 23 partners to assess the impact of aftermarket and nomadic devices. 2, 800 people were tested in large scale FOTS and 200 in Detailed FOTS plus 1,760 travel diaries and 6,400 questionnaires were compiled. The manual travel diaries provided valuable complementary data as they captured changes in personal circumstances. In-depth video was also used plus eye-tracking. The study began with 150 research questions that were iterated and conflated to 52 with the data centrally managed at a shared data centre at VTT, with detailed FOT data managed locally.

TeleFOT has chunked data into journey ‘leg’ types and led to the removal of the need to look at 1 Hz data points and also created structured theoretical modelling that helped to make the implications of the analysis easier to determine. Piloting worked well but might have been done sooner to test data flow.

Users were enthusiastic before the tests. This dropped off during the tests but increased again as they got used to using the device. The principal lesson learned was that one should never underestimate the time required for the data analysis.

Tom Alkim (RWS) completed this session by providing insight into Deployment Strategy, specifically through Cooperative Modelling in the Netherlands where several FOTS and initiatives have been undertaken since 2005.

This year, the Dutch Minister of Transport announced a transitional period over 10 years of public/private infrastructure-based projects as well as a roadmap for ‘route projects’ They will develop the cooperative ITS corridor with Germany and Austria (MoU signed 10/6/13), with one year preparation, one year testing and one year deployment.

Cooperative services initially involved roadworks warnings from roadside lorries, followed by probe data from vehicles back to the roadside. The future vision is:

- Reliable journey-times / forecasts
- Reduced congestion
- Fewer accidents
- Lower emissions
- Improved comfort

Session 4. The future for FOTS and FESTA (panel discussion)

The panel led an open discussion with the following core questions as prompts:

- What is the future for FOT? (e.g. type of FOT, use of technology)
- How should FOT technology be developed further? (taking advantage of the experiences of completed FOTS)
- How well does FESTA cope?
- Challenges for the Future (financial issues, autonomous vehicle/mixed vehicle fleets, demonstrating that FOTS offer useful results.

It was predicted that future technology will be smart phone based, and fixed in the car. For example, smart phone apps could have a remote connection into the CAN bus

There was a discussion about how Big Data is handled and also how this takes account of data for this being approved by voluntary participants.

Gwenaelle Toulminet (ASFA) described how the French are already proposing on-board SOS via mobile phone to replace existing fixed roadside orange boxes. This will e-call direct to the traffic control centre via SMS. Trials have indicated that this gains 4 minutes in detection/call out time as well as better positioning. In this case, a mobile phone app is better than an on-board app as it is safer for the driver of a broken-down car to exchange further information outside of the vehicle. Another app in deployment is an on-board VMS which will transfer event information into the traveller's phone based on location and direction of travel.

In terms of Autonomous Vehicles, it was suggested that OEMs are likely to be interested in working with FOTS as OEMs will soon start testing their own automated vehicles and will need to test these in the environment.

FOTs on road pricing are likely (especially as the end of the financial crisis will lead to more cars on the road) and road pricing solutions will need extensive testing.

Commuters currently mistrust the technology for automated vehicles and have the expectation that they would have to be 100% safe (as it their expectation of railways). A FOT may be useful to convince the public but also Governments and OEMs.

Challenges for the future?

- To increase environment/congestion consciousness (autonomic vehicles would increase the usable capacity on the roads)
- How to maintain cooperation between researchers and industry / OEMs once the initial C2X projects are completed
- How to move toward gathering details of all events rather than having to sample through a future 'grid' of instrumented vehicles and environmental sensors

- How to extract more out of existing data and Big Data?
- We are missing out on data already – e.g. Smart Cities data is not being fully exploited
- Clear requirements and measurement
- It is becoming increasingly difficult to keep up with the speed of technology development and FOTS are being overtaken
- It's a challenge to have all of the data when doing the analysis
- There is a danger that if funding agencies lose interest, OEMs will only fund positive results and objectivity may be undermined).

Conclusion and Summing up (Yvonne Barnard, ERTICO, Erik Thomasson, University of Leeds)

This final session summarised the conclusions from the day.

- Definition and selection of research questions. Stakeholder's needs should drive the process. Research should be iterative (but where to stop?). There are issues balancing between theoretical and practical issues and prioritising between them.
- Understanding the mechanisms (hypotheses) in FOTs versus understanding causation (why did this happen) in NDS.
- The focus in FESTA still is very much on Safety, but the problem is that accidents/events do not happen often enough to allow robust statistical analysis and interpretation, FOTs and NDS, however, also target other impact areas. There needs to be an editorial in the FESTA guidelines that makes the leap between the original safety focus and general good practice for other impact areas.
- Different approaches can be used in a mix of methods (eg semi-controlled, simulator..) but this would require a review of the definition of a FOT. Baselines can be taken from the data but also from other projects.
- A FOT-plan is recommended as it combines the theoretical approach with practical implementation, considering where to start and incorporating feedback loops and re-assessment of activities. In order to mitigate risks it is essential to identify them early on.
- Consideration of FOT data analysis, strongly suggested taking a 'Layered approach' and automating analysis wherever possible due to the volume of data to be analysed (and also to ensure standardisation of results). Standardisation more generally was an issue for data quality (e.g. of accident data, interoperability of services, ...). . In the meantime, documentation, standardisation and automation of routines is recommended in order to ensure that the skills and learning from FOTs are 'hard-wired' and are not lost as individuals move on.
- The increasing use of probe data in studies may provide new directions and opportunities.
- FOTs should not be overoptimistic in producing statistically conclusive results. Because FOTs are expensive and it is sometimes challenging to produce statistically significant and meaningful results, management of expectations amongst all project partners is therefore important. Aggregation across projects can increase the volume of data but there are barriers to doing this through different project-specific data issues and incompatibility. The group agreed that often 'Less is more' is a useful adage – i.e. FOTs should concentrate on achievable outcomes and studies that can be expanded pragmatically.

Yvonne concluded the event by introducing the forthcoming Support Action on FOTS – **"FOT-Net data"** which will commence in January 2014. FOT-Net Data targets efficient sharing and re-use of global data sets in up-coming analysis projects. It continues European and international networking activities in the FOT domain and aims to maintain and increase the momentum achieved in FOT-Net. FOT-Net Data explicitly addresses the need to exploit the collected data by:

- Developing the strategy for sharing and exploiting collected FOT data in national, European and international FOTs
- Addressing the actual data sharing and the procedures, templates and services needed for successful research on data gathered in earlier projects.
- Building a detailed catalogue of available data, enabling organisations to easily assess the value of different data sets for their research purposes.

Finally, the website (http://fot-net.eu) and Wiki (http://wiki.fot-net.eu) for the current FOT-Net project were recommended to seminar participants and to anyone else interested in FOTS.

Headline results from the participant's evaluation forms were that 100% of expectations had been met and 75% felt the seminar had been useful (the rest believed it to have been 'partly useful').

10 Summary of seminar evaluation by participants

Background to the seminars

During the FOT-Net project, a total of seven seminars were organised over a period of two and a half years. The organisation started with having a well-defined goal for each seminar. Usually this goal was split into headline themes covering issues participants should learn about during the day (for example: how to do a cost benefit analysis, how to define research questions etc.).

After this, the different parts of the programme needed to be defined with a desired balance between presentations, discussion, and interactive working sessions. One challenge was to endeavour to ensure that all the speakers were made aware of the total programme and their place in it in advance of the seminar, in order that they could each give a presentation that would fit well into the total programme and would pass on the intended learning to participants. This needed to be guided by the organising team. Sometimes speakers also needed to be guided by the organising team to specifically tune their presentations to each other, therefore the organisation needed to take care of this or bring the speakers directly in contact with each other.

The Seminar evaluation process

At the end of every seminar, a standard questionnaire was distributed amongst the participants. This consisted of two parts, information about the participant and the feedback on the seminar. The questionnaire contained questions about:

- content of the day, presentations and working sessions
- organisation of the seminar
- background of the participants
- familiarity with the FESTA methodology
- motivation for participation
- plans what to do with acquired knowledge
- expectations met
- missing something in the seminar
- usefulness of the information provided

The questionnaires were completed by a large proportion of participants and the feedback was used to improve subsequent seminars and gear them better to the needs and wishes of participants. It should be noted however, that it was not necessarily expected that an improvement would be observed in feedback seminar-by-seminar due to the wide range of different subjects and audiences covered by successive seminars. Despite this, there were no seminars where feedback indicated that the event had been less than very well received.

In this chapter, the main results of the questionnaires are given, bundled for all seminars in order to demonstrate the overall response of participants to the seminar series.

Background of participants

Note that not all participants filled in the questionnaires, for example because they had to leave earlier. However, full lists of participants were always maintained. The answers below are based on the forms that were returned.

The background of the participants is as follows:

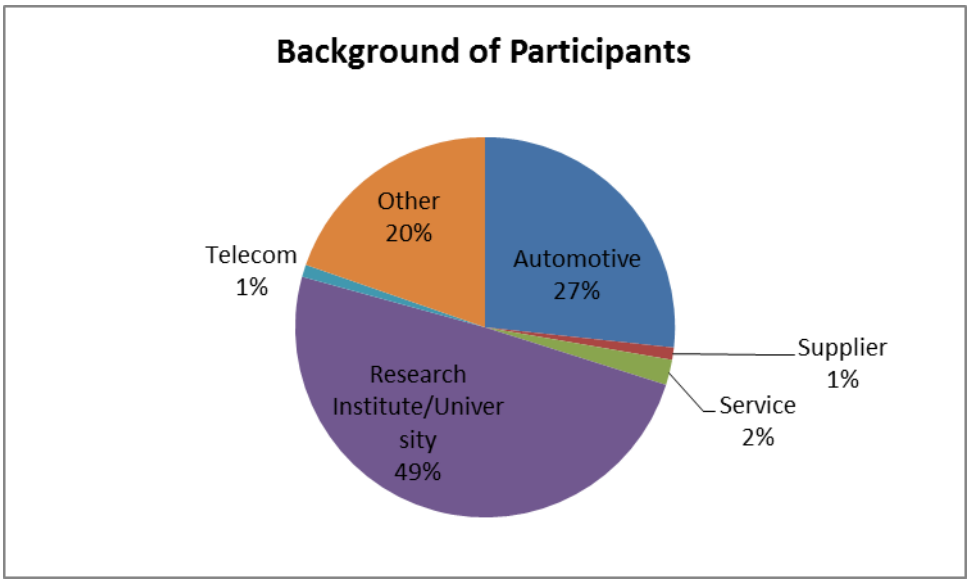

Figure 7: The background of the participants

Around half of the participants had a research background (university or research institute). The 'other' category mainly contained people from industry, public authorities, and consultancy. As would be expected for a research programme such as this, the majority of attendees proved to be from research institutions but there was nonetheless a good mix of participants from other target sectors. Compared with the earlier FOT-Net project, it was notable that the percentage of participants in FOT-Net 2 seminars from the automotive sector increased from 17% to 27%.

Appreciation of the sessions (presentations and working sessions)

Participants were asked how they appreciated the sessions within the programme (presentations and working sessions) on a scale from 1 to 5. The results show that the sessions were very well received, with 90% of participants rating them as good to very good; 10% as reasonable and only 1% below average. No delegates rated any of the sessions as having been bad. Follow-up of the lower responses revealed that commonly, any criticism was often associated with there not being enough time available to discuss the topic in full rather than there being issues with the seminar content.

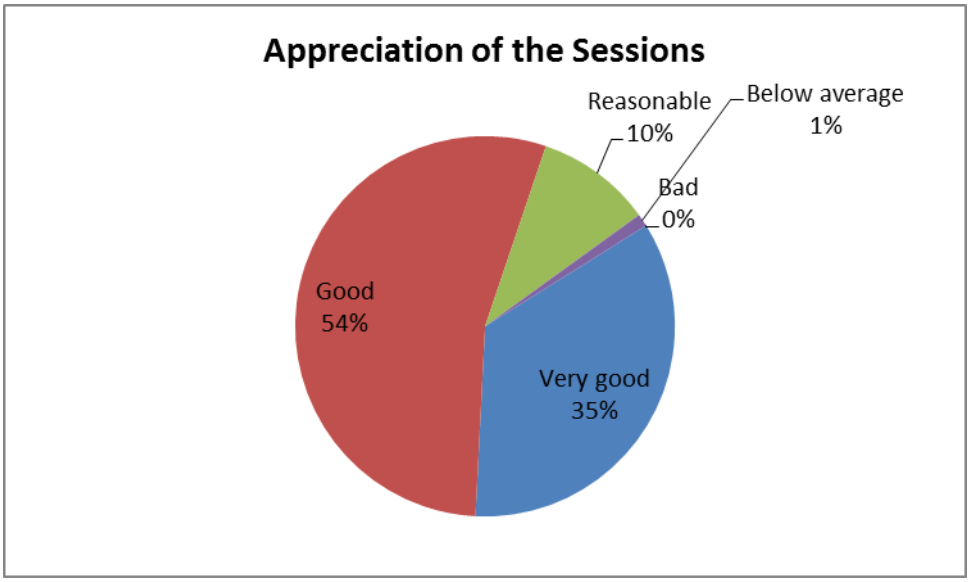

Figure 8: Appreciation of the sessions

Did the Seminars Meet Expectations?

The participants were asked if the seminar they had attended had met their expectations (possible answers: yes, no, partly, unsure). Over 80% of the respondents answered 'yes' and the remainder answered 'partly'. This was a significant improvement compared with the earlier FOT-Net project which had itself been deemed to have been a success. Wherever respondents provided reasons why there expectations has not been met in full, this feedback was followed up with individuals directly if appropriate, but was also taken into account in the planning for subsequent seminars.

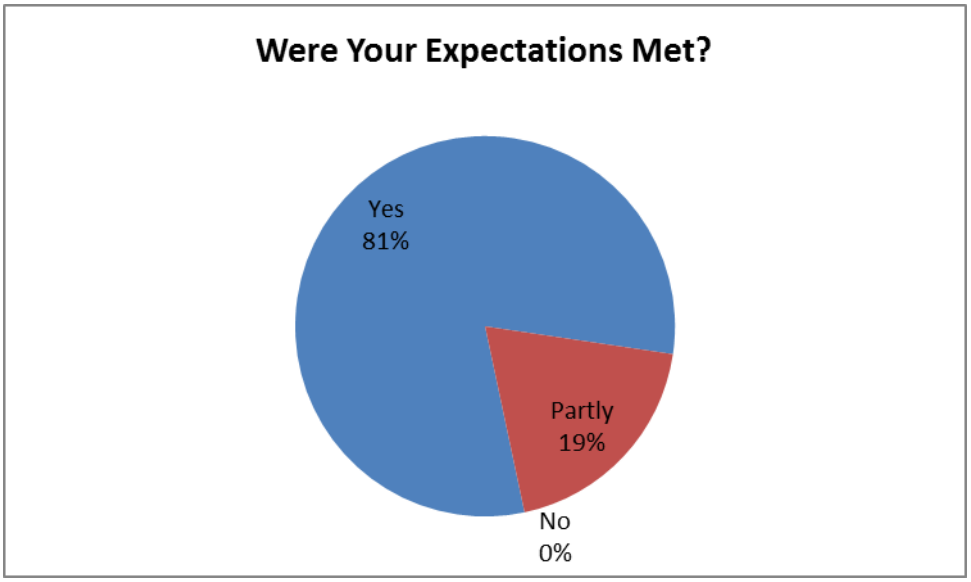

Figure 9: Were your expectations met?

Usefulness of information provided

Seminar participants were asked if the information provided at the seminar was useful for them (possible answers: yes, no, partly, unsure). Two thirds of respondents answered 'yes', and one third answered 'partly'. The latter is believed to be a reflection of the fact that frequently, the whole seminar programme would not have been directly relevant to every individual, simply because of the differing nature of the FOTs being represented.

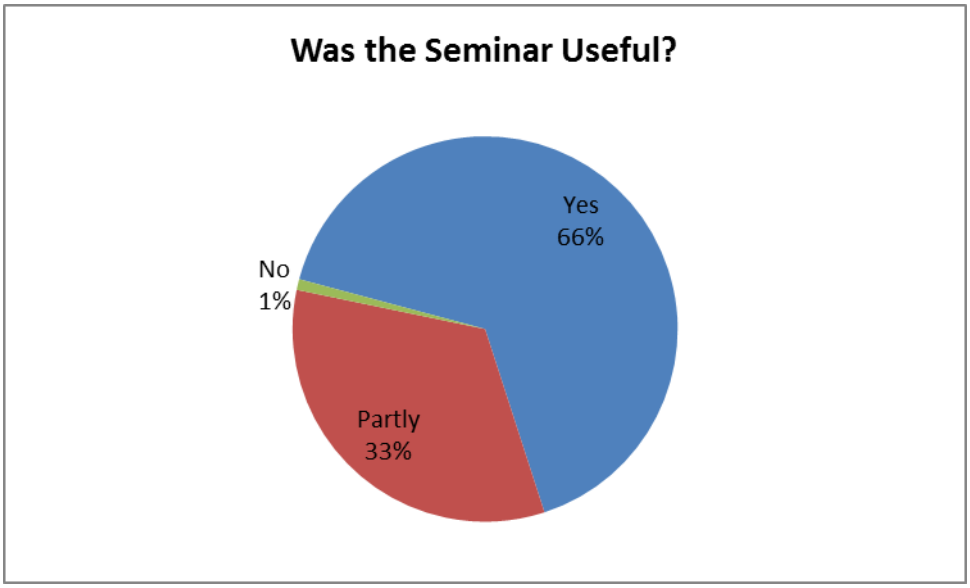

Figure 10: The usefulness of the seminars

Organisation of the seminar

The organisation of the seminar (asked on a scale from 1 to 5) was rated as very good by almost 60% of the participants and as good by over 40% of them. Only 1% of feedback indicated that the organisation had been only 'Reasonable'. From the accompanying comments provided by delegates, the most frequent criticism of seminar organisation was venue location and accessibility to travelling participants. The organising team had to take advice from local hosts on this, and the result was sometimes a compromise between convenience for local participants and those travelling into the country.

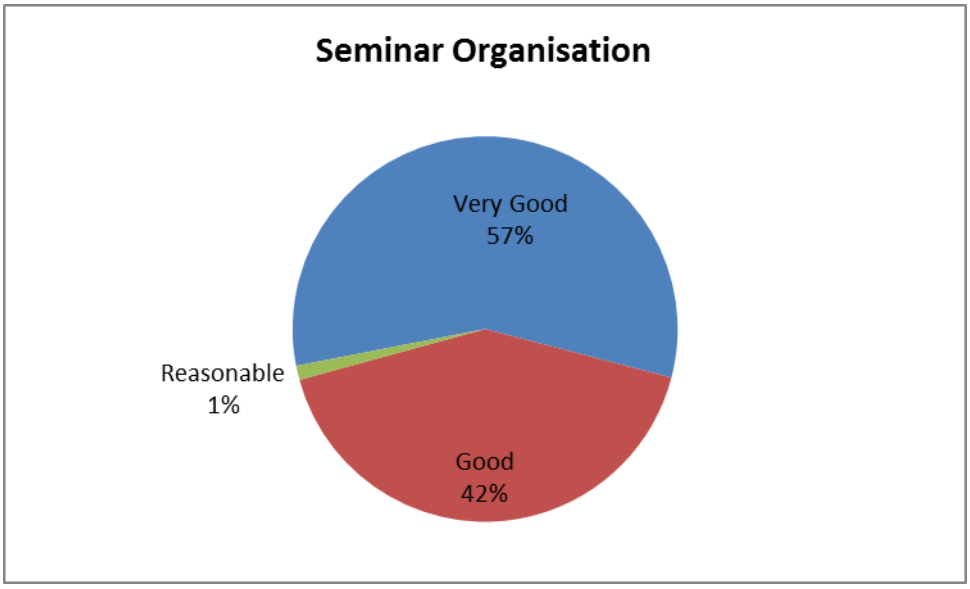

Figure 11: The The organisation of the seminars

11 General Conclusions

The FOT-Net 2 project has organised seven formal seminars as reported in this deliverable and significantly enhanced the capacity of the strategic networking initialised in FOT-Net 1. It has involved about 180 participants (or heads) who are experts, stakeholders and/or potential users of existing and/or future National, European and Global FOTs (e.g. US and Japan). The seminars brought together interests and challenges identified by a number of webinars, stakeholders' workshops and Working Group meetings which were reported in separate deliverables.

As recognised in FOT-Net 1, organising interesting seminars is a rewarding but challenging task, since success in achieving this depends very much on the judgement of the people who attend, whose interests and prior levels of understanding can only be anticipated by the organisers. Learned from the previous project, FOT-Net 2 carefully planned each of the seminars to ensure that they were held at the right place and the right time with targeted communication directed to the right people and the right speakers to achieve the best match of expectations and delivery. For example, most of the seminars were scheduled the day before/after another 1-day event, and the seminars were held in different countries.

Another distinctive feature of all the seminars was their highly interactive sessions designed to give the participants an opportunity to work on, instead of listen to, potential solutions and best practices directly related to their FOTs activities.

Planning each event and designing the content to include presentations and working sessions that connected well and provided room for interaction were not easy since there were no ready to use existing materials for such developmental processes. However, materials from the FOT-Net Working Groups and FOT projects often formed a good basis. The series of seminars did ultimately benefit from this level of pre-planning – as is demonstrated by the overwhelmingly favourable feedback received to all of the seminars that were run. All the materials created for these seminars are available on the project website and can be reused by the FOT-Net Data project[8] or whoever would be interested.

We believe that the FOT-Net 2 seminars have broadened and deepened the most difficult issues and topics that were raised from other project activities such as the Working Groups and the Workpackages on Tools and Stakeholder needs. The organisation of the seminars has made a direct and substantial contribution to the FESTA methodology which is under revision in order to incorporate new experiences and lessons learned from the current European and national FOTs.

[8] A newly funded 3-year project which will start on 01/01/2014 and end on 31/12/2016 (GRANT AGREEMENT No 610453).

12 References

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13 List of Figures

14 List of Tables

15 List of abbreviations

ACC	Advanced Cruise Control
CBA	Cost Benefit Analysis
FCW	Forward Collision Warning
FESTA	Field opErational teSt support Action
FOT	Field Operational Test
FOTIP	FOT Implementation Plan
ITS	Intelligent Transportation System
ND	Nomadic Device
NDS	Naturalistic Driving Studies
OEM	Original Equipment Manufacturer
PI	Performance Indicator
RQ	Research Question