Editorial

FOT-Net has been established by the European Commission to provide a networking platform for public and private stakeholders involved or interested in Field Operational Tests. FOT-Net has become the point of reference on Field Operational Tests, their organisation, set up and results.

I am glad to inform you that two new pan-European FOT projects can now join the FOT-Net community. Indeed, the European funded FOTs on cooperative systems DRIVE C2X and FOTsis have just kicked off. Both projects are presented in this newsletter. At this occasion, the newsletter also pays special attention to other cooperative systems FOTs in Europe, the US and Japan.

Cooperative Vehicle-Infrastructure Systems are based on two-way communication between vehicles or vehicles and infrastructure. This allows for many new applications in favour of better traffic management and road safety. However, the cooperation between vehicles and infrastructure also adds additional challenges to conducting FOTs: not only the vehicles need to be equipped, but so does the infrastructure.

FOT-Net will focus its activities in the upcoming period on addressing the particular challenges related to conducting cooperative systems FOTs. On 15 April 2011, a seminar on practical issues in starting up a FOT of cooperative systems and defining research questions, hypotheses and performance indicators will take place in Vigo, Spain.

This newsletter also reports on the FOT-Net Stakeholder Workshop, which took place on 24 March and discussed roadmaps towards the deployment of best practices. Public authorities are stakeholders with a key interest in the results of FOTs as these will support them in establishing the right policy framework for the deployment of ITS technologies.

I wish you a pleasant read!

Myriam Coulon-Cantuer
FOT-Net Project Officer
DG INFSO, European Commission

In the spotlight

Test Site Sweden

Test Site Sweden (TSS) in Gothenburg is a large-scale functional test site operating since 2008. It consists of two parts, one in normal traffic in the tunnels and entrances of Gothenburg, and the other using three closed test tracks. Due to its northern location, climate specific testing can be performed.

FOT-Net talked to Peter Follin from Lindholmen Science Park, John-Fredrik Grönvall from Volvo Cars (VCC), and Helena Gellerman from SAFER/Chalmers about TSS.

Could you tell readers a little bit about TSS?

Helena Gellerman: TSS, based near Gothenburg, Sweden’s second largest city, is operated by SAFER and Lindholmen Science Park. SAFER focuses on in-vehicle data acquisition, data storage and analysis and Lindholmen Science Park on road infrastructure and back office.

Peter Follin: TSS has been the test site for several national and European projects, such as CVIS, SAFESPOT, SemMiFOT and euroFOT. Upcoming projects include DRIVE C2X, which will test several mainly safety related use cases, and COSMO, which will test the "Green light optimal speed" use case.

John-Fredrik Grönvall: In terms of size and facilities, TSS compares well with other European test sites. Presently, Volvo Cars supplies 100 vehicles, with more to be added, and AB Volvo 30 trucks. Also, over 400 taxis are supplying floating car data. As a car manufacturer, this is a good place to test car systems with urban roads, highways and test tracks close to each other.

Peter Follin: In terms of available infrastructure, we have all the equipment from the CVIS and SAFESPOT projects. For COSMO, we will have additional Road Side Units (RSUs) – possibly mobile – once talks with the city authorities are completed.

What are the specific strengths of TSS?

Helena Gellerman: There are several! First of all, the reason for the three of us being here, TSS covers all aspects of testing: road infrastructure, data acquisition in vehicles, storage and analysis, and the vehicles themselves.

Peter Follin: All the Swedish OEMs are present and active here – Volvo Cars, Volvo Trucks, Saab Automobile and Scania.

Helena Gellerman: This is something quite unique and allows us to go into new projects with a lot of confidence.

John-Fredrik Grönvall: We also have a full range of data acquisition systems, currently used in SemMiFOT and euroFOT. One particular strength here is the focus on human behaviour and interaction with the systems, for instance with eye tracking – this allows us to measure benefits more exactly, evaluate human distraction, interference and acceptance. That is the Swedish approach, to see the driver as part of a system.
Helena Gellerman: A further strength is the effort we have put into data analysis. All vehicle, traffic, infrastructure and human behaviour data can be collected and analysed simultaneously. This is used now in euroFOT and will be used in upcoming projects too. As we are involved in the whole data chain – from acquisition to analysis – we are well placed to produce high quality data and also understand the limitations of these data.

Finally, TSS also enjoys access to traffic management data in cooperation with the relevant public authorities, notably the national road database and local traffic management system.

What are the expected results regarding cooperative mobility?

Helena Gellerman: Expectations are twofold. Functionality should be tested with regular drivers, to assess the driver-vehicle-infrastructure interaction, driver acceptance and benefits for different stakeholders. The result gives an idea on which functions have the highest market potential.

Peter Follin: The second area of interest is of course the ongoing debate as to which systems should be used in terms of cooperative mobility. Many stakeholders have a strong interest in one or the other system, whether 3G, 4G, 802.11p… Different projects may use different approaches – e.g. DRIVE C2X will use 802.11p. It is difficult to predict which if any will emerge strongest – most likely this will have legal/regulatory aspects.

John-Fredrik Grönvall: It is important that TSS supports all possible systems. When it comes to final deployment it is unlikely to be an either/or issue, so we must be as open as possible.

How does TSS fit in the broader deployment strategy?

Peter Follin: There is of course the ITS Action Plan, which is Europe-wide. In Sweden, we have ongoing discussions regarding the strategy plan for cooperative systems.

Helena Gellerman: We are focusing on the functionality and benefits for different stakeholders, which is key to the deployment. There are also discussions about which technology to use, and here TSS can also provide value. Our strong links with relevant authorities and the strong results we get, mean that we can provide good data for the government and road authorities. The most important thing is to make decision makers aware of how cooperative systems work and of their benefits.

Peter Follin: We do this by involving them, by showing the data and from there the benefits.

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John-Fredrik Grönvall is Senior Engineer and Manager for Volvo Car Traffic Accident Research Centre and involved in SeMiFOT, euroFOT and Drive C2X, among others.

Helena Gellerman is Project Manager FOT/NDS at SAFER and involved in SeMiFOT, euroFOT and Drive C2X.
Fifth FOT-Net Stakeholders Workshop

The theme of the 5th Stakeholders workshop on 24 March was “Deployment Roadmap: how FOTs are used to reach policy goals”. It provided a forum for discussion on deployment best practices and the role of public authorities in the definition and implementation of FOTs. Public Authorities have a key interest in FOT results as these will support them in establishing the right policy framework for the deployment of ITS.

Different approaches for the use of FOTs towards deployment were presented from Europe, US and Japan, each with their particularities and challenges. Some approaches are more innovation oriented but not necessarily more harmonised, while others are embedded in a policy framework but could benefit from the contribution of other stakeholders for defining the FOT research programme and questions.

Participants also discussed the important role of dissemination in FOTs, by:

- linking politicians to experts. There is a need to involve policy makers in the process and raise their awareness, as they are the ones defining mobility goals and means. Experts can help them avoid taking uninformed decisions about mobility;
- using the FOTs as an awareness raising activity and training, with those who will after all be using the systems that are being tested and also with those who can set an example, e.g. politicians. Drivers could be used as role models to generate acceptance;
- creating support from stakeholders. FOTs can provide a safe platform for all stakeholders to work together.

European FOT related activities also looked into how the project results can be transferred to stakeholders: what is the exploitation plan, what will be done after the FOT is completed to ensure deployment?

FOT-Net also took this opportunity to highlight its new activities: the revision of the FESTA methodology, the plans for FOT knowledge transfer (seminars) and the development of methodological tools to identify stakeholder needs.

Presentations are available on www.fot-net.eu.

Revision of the FESTA methodology

One of FOT-Net’s goals is to revise the common European FOT methodology, FESTA, especially with regard to different typologies of applications, i.e. ADAS, nomadic devices, cooperative systems, and naturalistic driving studies. Furthermore, the revised FESTA handbook will take into account the feedback gathered during 8 seminars on issues such as starting, developing and implementing a FOT, evaluating the combination of systems, data gathering and handling, cooperative systems, data analysis and impact assessment.

As a first step, the FOT Implementation Plan will be revised on the basis of experiences in different application domains. A second step is to revisit the different sections of the FESTA chain in view of the specific requirements highlighted by FOTs that have applied FESTA. The planned improvements include:

- increasing readability and user friendliness, e.g. integrating explanations and examples, making the document more accessible through hyperlinks;
- elaborating the handbook sections based on feedback from the seminars, e.g. integrating issues like definition of uses cases, research questions and hypotheses, performance indicators and study design, measures and sensors, ethical and legal issues, data acquisition and data analysis;
- enhancing the manual with topics that are not sufficiently covered: this will partly be addressed during the FESTA revision and partly through coordinated Working Groups.

The first FESTA revision will be available from September 2011.

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On 15 April 2011, a seminar on ‘Practical issues in starting up a FOT of cooperative systems and defining research questions, hypotheses and performance indicators’ will take place in Vigo, Spain. This seminar is organised in collaboration with CTAG, the Galician Automotive Technology Centre. The focus of this seminar is on the first stage of a FOT: how to develop research questions, hypotheses and performance indicators? In addition to presentations from the three ongoing cooperative systems FOTs (DRIVE C2X, FOTsis and SISCOGA), the seminar will provide an overview of the FOT methodology developed in the FESTA project and the recommendations coming from earlier seminars.

The seminar targets people involved or interested in FOTs (especially in FOTs on cooperative systems), coming from research, industry or public authorities.

For the final agenda and registration, visit www.fot-net.eu

News from FOT projects

The FOT projects carried out around the world represent an invaluable source of scientific data. FOT-Net promotes and facilitates the exchange of knowledge. In this section we report regularly about objectives and results of ongoing FOTs.

**euroFOT**

euroFOT is the first European FOT that is evaluating the impact of different Advanced Driver Assistance Systems on driver behaviour, vehicle safety, efficiency and sustainability providing a final cost/benefit analysis. euroFOT is currently at the stage of FOT execution and data collection. The first operation sites started this phase in February 2010 and gradually all other sites started to recruit drivers and run the tests.

The Italian VMC currently has 237 Lancia Delta owners with Lane Departure Warning and 175 drivers without the function, providing only subjective data using the on-line questionnaire provided by Politecnico di Torino. The recruitment and the management of the FOT operation is a joint effort of CRF and Politecnico.

In Sweden, Volvo Technology and Volvo Cars have almost completed the tests. Volvo Cars has a fleet of 100 V70 and XC70 vehicles while Volvo Technology operates two fleets of FH12 trucks in the Netherlands and in the UK.

In France, the operation had a delayed start in November 2010 but since then 14 Renault Clio and five Renault Laguna drivers have been evaluating the Speed Regulation System. To complement the data provided by the vehicles’ infrastructure, CEESAR has installed an additional radar sensor. CEESAR has also supplied five of its own cars which are equipped with an internal video system to record the external and internal environment of the test vehicles.

In Germany, five operating sites are proceeding with the tests. Ford, Volkswagen and MAN run the test in Operation Centre 1 while Daimler and BMW are part of Operation Centre 2. Ford runs 96 customer owned vehicles – mainly Galaxy, S-Max and Mondeos – and two of its own test vehicles studying the Curve Speed Warning feature. Volkswagen has provided 32 VW Passat vehicles with ACC and LDW functions. MAN has been running 56 TGX trucks since last November. Operation Centre 1 is using CTAG’s data logger to record data from the vehicles subsystems. Daimler and BMW are running 15 vehicles to evaluate their Safe Human Machine Interface solution. They are running in 3 month cycles with different drivers leasing the test vehicles.

The euroFOT field operational test will be officially closed in May 2011.

More information: www.eurofot-ip.eu
Over the last few months, TeleFOT had extensive exchanges with its stakeholders, e.g. through the Second General Stakeholder Forum in December, organised in conjunction with the fourth FOT-Net Stakeholder Workshop. The forum offered the opportunity to present achievements in the field of exploitation, a relevant activity especially in the third project year, with the testing phase in operation at almost all sites and initial data starting to come out. In addition, workshops were organised in each of the Member States that are running FOTs.

An important component of the piloting process has been the data flow testing. Using both subjective and logged data from the Greek, Finnish and Swedish test sites, analysts were able to show good consistency of data and preliminary results from the FOTs which were in accordance with intuitive expectations. This outcome was extremely encouraging and data analysts are confident that the data flow will facilitate interesting and useful results from all test sites until the end of TeleFOT and probably beyond. Pilot analyses of detailed FOT data are also in progress and preliminary results are equally positive.

Since September 2010, the majority of TeleFOT large-scale FOTs have become operational. In Sweden, all three FOTs commenced with around 700 users in total and in Finland a FOT is running with some 200 users. The Greek FOT involves around 150 users, while at the Italian and Spanish FOTs more than 250 users are testing nomadic device based functionalities. Tests will also soon start in the UK, while in France cooperation between the nomadic device supplier and the in-band modem developing company is being established to initiate the pilots on a nomadic device eCall alert system.

More information: www.telefot.eu

Cooperative systems FOTs

Cooperative systems FOTs pose additional challenges, since both vehicles and infrastructure need to be equipped. As resources usually are limited, only a certain stretch of infrastructure can be equipped. One challenge is to ensure that the equipped vehicles travel on the equipped roads and, in case of vehicle-to-vehicle applications like cooperative cruise control, to frequently meet each other in order to collect a reasonable data set about the cooperative applications under evaluation. This should be secured without giving the drivers many instructions that would challenge the FOT methodology in its principle of having ordinary drivers testing the applications in their daily routine driving.

So far, FOTs of cooperative systems have been conducted mainly in the US and Japan. In some European countries, FOTs have started and results are expected around 2012.

Two pan-European FOTs on CS have just kicked off, i.e. FOTsis and DRIVE C2X.

The most important CS FOTs are listed here. More details on these projects can be found in the FOT wiki, wiki.fot-net.eu. Here we present the European FOTs FOTsis and DRIVE C2X, as well as the Spanish FOT SISCOGA, the Japanese SKY FOTs, the Dutch Connected Cruise Control project, and the American Connected Vehicle Safety pilot.
Within the EU’s Seventh Framework Programme, IRIDIUM, OHL Concesiones and another 21 companies, associations, research bodies and universities, from 8 different European countries, have created an R&D&i Consortium. The FOTsis consortium will develop and test services based on communication technologies for improved connection between the vehicle, infrastructure and traffic management centre.

The FOTsis project is a large-scale field test of road infrastructure management systems needed for the operation of seven close-to-market cooperative I2V & V2I technologies (the FOTsis services). FOTsis will assess in detail those requirements regarding their effectiveness and their potential for full-scale deployment on European roads. Specifically, the project will test the incorporation of new cooperative systems technology to provide services in four European test communities.

These different technologies will be tested through seven services focusing on the main targets of the project: safety, more intelligent mobility and more sustainable road transport systems, by means of communication and equipment in the vehicle and in the infrastructure as it is shown in the sketch to the right.

FOTsis expects to succeed in these technological developments in order to achieve an interoperability that would make their implementation throughout Europe possible. The consortium has innovated with the inclusion of road operators as partners and coordinators and therefore focusing the tests and developments on the infrastructure. This inclusion will also permit the FOTsis project to trial the present capability of European roads to manage the technologies in all kind of environments and locations.

**FOTsis**

Even if the advantages of cooperative driving are well understood, no large scale experiments were carried out so far to prove the benefits of cooperative systems (CS). The EU funded DRIVE C2X Integrated Project kicked off on 27 January in Torino, to address the need of large-scale testing and carry out a comprehensive assessment of CS through an extensive European FOT. DRIVE C2X has four major technical objectives:

- create and harmonise a European wide testing environment for CS;
- coordinate the tests carried out in parallel throughout the DRIVE C2X community;
- evaluate CS;
- promote cooperative driving.

DRIVE C2X aims to evaluate several functions such as traffic flow, traffic management, local danger alert, driving assistance, internet access and local information services, and test site-specific functions.

DRIVE C2X will build on previous projects including: PRE-DRIVE C2X tools and methods for successful test and evaluation; the FESTA handbook; euroFOT and TeleFOT.

In particular PRE-DRIVE C2X enabled the selection of seven test sites:
- system test site Helmond provides the best fit to the defined PRE-DRIVE C2X requirements;
- Finland, France, Germany, Italy, Sweden and Spain provide functional test sites.


Several deliverables are expected at the end of 2011, regarding the completion of the FOT framework, the FOT system validation, FOT research questions and experimental design.

More information: f.fischer@mail.ertico.com

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More information: f.fischer@mail.ertico.com
**SISCOGA**

The SISCOGA FOT on cooperative systems in the Spanish Galician region, managed by CTAG and in cooperation with the Spanish Ministry of Transport, is now part of the DRIVE C2X project, as an associated test site.

The existing application layers as well as unforeseen use cases will be adapted to DRIVE C2X specifications, including new functionalities.

In the meantime, the second set of roadside units is being deployed. Testing of the units and their communication with the traffic management centre and the on-board units installed in two research vehicles is also ongoing. Interoperability issues with DRIVE C2X will be taken into account.

Participants are being selected, and the possibility to have the nomadic device that will be used as HMI as a reward is very well received. The FESTA methodology is applied, be it with some adaptations to fit the requirements of cooperative systems.

The actual FOT is expected to kick off in summer.

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**Japanese SKY FOTs**

The Japanese SKY Project was launched in October 2004 in Yokohama to contribute to reducing traffic accidents and congestion. SKY is a private sector collaboration between Nissan, NTT DoCoMo, Panasonic and Xanavi Informatics (now Clarion). Support has also been provided from the public sector, i.e. the National Police Agency of Japan (NPA) and the Kanagawa Prefectural Police.

The SKY project includes several FOTs based on vehicle-infrastructure communication. The field tests, involving large numbers of ordinary drivers on normal roads, ran from 2006 to 2009, generating good results in relation to quantitative effectiveness, user acceptance, HMI issues, etc.

In the meantime, several systems have been generally deployed on Japan’s roads, including School Zone ISA by car-navigation map database (2008-), Skid Incident Information Service by probe (2008-), Dynamic Route Guidance by probe (2008-), Intersection Collision Avoidance Assistance using V1 communication (2010-), Opposite Direction Driving Avoidance Assistance on highway by map database and GPS (2010-).

Japan has a good car navigation penetration, and now almost all Nissan car navigation systems include the aforementioned functions. Customers who had already bought Nissan cars and navigation systems two years before can still obtain these functions through map database updates.

In Japan, about 2/3 of traffic accident fatalities are now pedestrians, cyclists, and motorists. Studies are currently focusing on these groups, with special attention for older people.

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**Connected Cruise Control**

Current cruise control systems cannot detect vehicles several kilometres downstream, enabling the driver to anticipate these conditions. Connected Cruise Control (CCC) however, will make this possible. CCC is a breakthrough technology that provides advice to the driver regarding speed, headway and lane in order to anticipate and eventually prevent shock waves leading to congestion.

A consortium of Dutch industries and knowledge institutes is cooperating to introduce CCC in the coming years. The CCC project is part of the Dutch innovation programme High Tech Automotive Systems (HTAS).

The CCC project aims to find answers to research questions supporting the development of CCC and to deliver proof of its effectiveness. It studies the overall architecture of CCC systems and the fusion of data from an intelligent camera, the CAN bus, GPS and a dynamic digital map. It conducts research on the online traffic flow models needed to predict traffic flows and provide advice on speed, headway and lane use. It also looks into the combination of information from in-vehicle systems and traffic flow models and the design of the Human Machine Interface.

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**Connected Vehicle Safety Pilot**

With the Connected Vehicle Safety Pilot, the US Department of Transportation is testing vehicle-to-vehicle (V2V) and vehicle-to-infrastructure technologies in normal conditions, deploying more than 2,000 vehicles with wireless devices.

The programme aims to determine how motorists cope with driving while using the latest V2V technology, to make sure that the devices are safe, do not distract drivers, nor cause unnecessary crashes.

The scheme consists of two components:

- **Smart Pilot Driver Clinics**: real drivers test in-car V2V technology in a controlled environment to see how they handle in-car collision warnings, do not pass signals and warnings that a car ahead has already stopped;
- **Smart Pilot Model Deployment**: thousands of vehicles fitted with V2V devices are in communication with each other while operating on everyday streets in a highly concentrated area.

The Safety Pilot is important to demonstrate real world V2V safety capability and to provide data supporting the benefits assessment leading up to a regulatory decision point by the National Highway Traffic Safety Administration in 2013 for V2V safety applications.

FOT-Net Associated Partners

A number of stakeholders have responded to FOT-Net’s invitation for Associated Partnership. In this issue we introduce Continental. If you would like to become an Associated Partner, please contact info@fot-net.eu

FOT-Net Associated Partner Profile: Continental

The Automotive Group of Continental is one of the leading global automotive suppliers. The Chassis & Safety division – one of Continental’s three automotive divisions – develops and produces electronic and hydraulic brake systems, chassis control systems, sensors, advanced driver assistance systems, airbag electronics and sensorics, washer systems and electronic air suspension systems. Its core competence is the integration of active and passive driving safety into ContiGuard®.

In this context, ADAS are key technologies to advance in road safety and for realising the “Vision Zero”. Vision Zero is a safety philosophy in which no one is killed or seriously and permanently injured in road accidents. As traffic is getting more and more complex and stressful, drivers are often distracted by various factors. Driver mistakes and inattention remain the number one cause of traffic accidents. ADAS increase traffic safety by supporting the drivers and making driving more comfortable and relaxed again. The results of the European euroFOT project will help to illustrate what safety means in terms of numbers, emphasizing the positive effects that ADAS already have on traffic safety as well as their potential for the future.

More information: www.continental-corporation.com, dieter.kroekel@continental-corporation.com

Upcoming events

FOT-Net Seminar on Practical issues in starting up a FOT of Cooperative Systems
15 April, Vigo (Spain), www.fot-net.eu

Dutch Automotive Week – Building the Future in Mobility
14-22 May, Eindhoven – Helmond region (NL) www.automotiveweek.nl

8th ITS European Congress
6-9 June, Lyon (FR), 2011.itsineurope.com

Final PROLOGUE workshop
22 June 2011, Vienna (AT), www.prologue-eu.eu

Driver Distraction and Inattention Conference
5-7 September 2011, Gothenburg (SE), www.chalmers.se/safer/ddi2011-en/

ITS World Congress 2011
16-20 October, Orlando Florida (USA), www.itsa.org/worldcongress/2011/News_and_Events/Calendar/2011_ITS_World_Congress_Orlando.html

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