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FOT-NET 8th Stakeholders Meeting
Lessons learned from Pilots on Cooperative Systems

Report

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Author(s)	Yvonne Barnard & Laetitia Fernandez
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Table of Contents

1 Agenda 4
2 Introduction 5
3 Meeting objectives 5
4 FOT-Net Working Groups, stakeholder needs and seminars 5
5 Panel - Tour de table & short introduction 6
6 Session 1 – Interoperability of deployed cooperative systems in the pilots 8
7 Session 2 – Data sharing 10
8 Session 3 – Deployment & business plans 12
9 Closing remarks and next steps 13

1 Agenda

09:00 – 9:30	Welcome coffee and registrations		
9:30 – 11:00	**Setting the scene**		
9:30	Meeting objectives		Maxime Flament, ERTICO – ITS Europe
9:45	FOT-Net Working Groups: an update		Yvonne Barnard, ERTICO – ITS Europe
10:15	Form Panel - Tour de table & short introduction		Yvonne Barnard, ERTICO – ITS Europe
	Co-modality	Co-Cities:	Alexander Frötscher, AustriaTech
	Traffic efficiency & sustainability	Compass4D:	Siebe Turksma, Peek Traffic
		eCoMove:	Philipp Gilka, DLR
	Safety	DRIVE C2X:	Tapani Mäkinen, VTT
	Electromobility	smartCEM:	Luca Pascotto, FIA
	Framework for foundation of mobility services	MOBINET:	Paul Kompfner, ERTICO – ITS Europe
11:00 – 11:15	Coffee Break		
11:15 – 12:45	**Session 1 – Interoperability of deployed cooperative systems in the pilots** - Is interoperability needed within and between pilots? What do pilots gain from interoperability? - How can we test interoperability? Should interoperability tests be organised across pilots? - How do you manage interoperability issues in your pilot, and what are they?		Moderator: Hossein Zakizadeh, Volvo
12:45 – 13:45	Lunch Break		
13:45 – 15:15	**Session 2 – Data sharing** - What can we gain from exchanging data? - Which data should be shared between pilots? - Are the pilots willing to share data? - How can we put data sharing into practice?		Moderator: Helena Gellerman, SAFER
15:15 – 15:30	Coffee Break		
15:30 – 17:00	**Session 3 – Deployment & business plans** - What will be achieved in terms of deployment at the end of the pilot? - Should pilots join forces for promoting each other's successful deployment? - What can be reused from your deployment experience? - What added-value could a community of pilots bring?		Moderator: Tom Alkim, RWS
17:00	Closing remarks and next steps		Wolfgang Hoefs, European Commission DG CONNECT Maxime Flament, ERTICO – ITS Europe
17:30	Workshop close		

2 Introduction

In the 8th edition of the Stakeholders Workshops, we took a closer look at what can be learned from past, current and recently launched pilots on Cooperative Systems. The benefits of Cooperative Systems towards safer and more efficient mobility have been documented in several national and European projects. Yet full-scale deployment of Cooperative Systems in Europe has not been reached due to a number of obstacles. Pilots can however bridge this gap and serve as the intermediary step between FOTs and deployment, testing and assessing Cooperative Systems applications before these can be deployed. In addition, by their very nature, pilots require that all value-chain stakeholders are involved in the pilots' roll-out.
The European Commission believes in the potential of pilots and has greatly invested in the running of pilots at pan-European level, in particular through the Competitiveness and Innovation Programme (CIP). To further promote deployment the European Commission stipulates to its funded pilots that the applications assessed remain in place after the pilot is completed.
What can we learn from these pilots? At the 8th FOT-Net Stakeholders Workshop several pilots funded by the European Commission were invited to discuss this topic and share their knowledge.

3 Meeting objectives

Maxime Flament (ERTICO – ITS Europe) explained the structure and work being done in the FOT-Net support action. The objective of FOT-Net stakeholders meetings is to provide a forum for cooperation, discussion and information exchange. In this workshop we took a closer look at what can be learned from past and current pilots on cooperative systems. We are now in a phase where there is a shift from information exchange to discussion on what needs to be done to make deployment more successful.

Within CIP projects partners are funded by 50%, and they are willing to invest in deploying services that continue post-project. In previous workshops we discussed other cooperative system projects such as FOTsis and DRIVE C2X. This workshop on the other hand focused on the pilot projects, and especially on data sharing, interoperability and deployment.

4 FOT-Net Working Groups, stakeholder needs and seminars

Yvonne Barnard (ERTICO – ITS Europe), who took over the coordination of FOT-Net from Irina Silva, explained the activities that are on-going in the working groups on Data Analysis, Events and Incident Definition, Legal and Ethical Issues, Impact Assessment and Scaling Up, and Data Sharing. The working groups are currently preparing their reports and feedback to the FESTA methodology, and will organise webinars in April or May to discuss their results. The groups on Legal and Ethical Issues already published their intermediate report (available on the FOT-Net website).

Results will also be presented at:

- Special session on Synergy between naturalistic driving studies and field operational tests, ITS European Congress, Dublin, 5 June 2013

- FOT-Net 6th International Workshop, Tokyo, 13-14 October 2013 (before the ITS World Congress)

WP6 on Stakeholder Needs Analysis presented their intermediate results. 55 stakeholders responded to the stakeholders' survey in 2012. These stakeholders come from a wide variety of backgrounds: industry, public authorities and research organisations. The majority of respondents who were involved in a FOT answered positively to the question: *Do you think that the participation of your organisation in the European FOTs has met the original expectations?* More details can be found on the presentation slides.

Three seminars are planned for 2013:

- A special FOT-Net seminar for cooperative systems pilots, Barcelona, 4-5 April, 2013
- FOT-Net Seminar on Tools for gathering and analysing data, especially in FOTs of cooperative systems, Berlin, 25 April 2013
- Seminar in September 2013, for which input was asked from the stakeholders on the topic.

5 Panel - Tour de table & short introduction

The following projects presented themselves:

Co-Cities:	by Alexander Frötscher, AustriaTech
Compass4D:	by Siebe Turksma, Peek Traffic
eCoMove:	by Philipp Gilka, DLR
Safety DRIVE C2X:	by Tapani Mäkinen, VTT
smartCEM:	by Luca Pascotto, FIA
MOBINET:	by Paul Kompfner, ERTICO – ITS Europe

Co-cities: Cooperative Cities extend and validate mobility services
The Co-cities project works on providing real-time travel information services.

Compass4D: Cooperative Mobility Pilot on Safety and Sustainability Services for Deployment
Compass4D pilots three applications: Forward Collision Warning (FCW), Red Light Violation Warning (RLVW), and Energy Efficient Intersection Service (EEIS).
Their objectives are to:

- demonstrate the positive cost-benefit of Cooperative Systems
- make sure the services remain alive after the end of the project
- become a reference model for other cities
- raise public awareness and user acceptance
- support international cooperation and standardisation

eCoMove: Cooperative Mobility Systems and Services for Energy Efficiency

The objective of eCoMove is to develop a combination of cooperative systems and tools using V2V and V2I communication to help:

- drivers sustainably eliminate unnecessary fuel consumption;

- fleet managers manage their vehicles more economically and promote eco-driving through feedback & incentives;
- road operators balance traffic flows in the most energy efficient way.

DRIVE C2X
The objectives of DRIVEC2X are to:

- carry out a comprehensive assessment of cooperative systems through extensive European FOT
- to create and harmonise a European-wide testing environment for cooperative systems
- coordinate the tests carried out in parallel throughout the DRIVEC2X community
- Evaluate cooperative systems
- Promote cooperative driving

Functions to be tested are related to: traffic flow, traffic management, local danger alert, driving assistance, internet access and local information services, and test-site specific functions.

smartCEM: Smart Connected Electro Mobility
The objectives of smart CEM are to:

- prove that user acceptance of electrical vehicles can be increased by at least 15%
- evaluate how much transport efficiency can be optimised
- develop tools
- identify barriers and address all deployment elements
- support pan-European interoperability
- pave the way for wider acceptance of adopting electro mobility in all types of road transport
- integration of new schemes
- inform about the smartCEM services

smartCEM implements 5 services: navigation, efficient driving, trip management, charging station management, and sharing management.

MOBINET
Mobinet is not a pilot project but aims to create a single Europe-wide service platform to provide:

- a federated directory of all European online services for transport and mobility;
- an identity authentication and management scheme to allow single sign-on for any user for multiple services;
- a unified accounting and mobile payment framework, and mechanism for clearing between providers;
- a secure operating environment for in-vehicle and portable devices, offering users access to a dedicated app-store, and service providers access to all users with any type of compliant device;
- a B2B marketplace for automatic negotiation of service agreements when adding extra service components and data sources to existing service offerings.

For more detail we refer to the project presentations available at the FOT-Net website.

6 Session 1 – Interoperability of deployed cooperative systems in the pilots

The questions addressed were:

- Is interoperability needed within and between pilots? What do pilots gain from interoperability?
- How can we test interoperability? Should interoperability tests be organised across pilots?
- How do you manage interoperability issues in your pilot, and what are they?

Hossein Zakizadeh (Volvo) moderated this session. He started with emphasising the difference between data, information, knowledge and wisdom. Our goal is to reach "wisdom" together, not just to exchange data.

Different views were stated on interoperability and the importance it has in different projects and stages of development. In the discussion the following elements were addressed.

The nature of cooperative systems

Cooperative systems may mean different things. Some user-applications run on a smart phone, others are connected to the vehicle.

The need for interoperability

In large projects such as DRIVE C2X, large effort is already made on interoperability, however between pilots this would require more resources. Systems have to be interoperable if they are to be used at different sites, for example in different cities – as in some pilot projects.

It depends on the objective of the project whether focussing on interoperability is worth the effort. If the project is research oriented, interoperability is only "nice-to-have", if deployment is the goal, interoperability is essential.

The role of standards

The way to solve interoperability issues is to develop and apply standards, not necessarily by bringing projects together to solve the issue.

It would be nice to have some kind of certification of interoperability e.g. as in electromagnetic certification.

It should be required that all pilots use the C-ITS standards (ETSI-CEN)

Interoperability on different levels:

At data-level it is not such a problem, but the goal of cooperative systems is to exchange information, whatever technology is used. At functional level interoperability is a challenge; functions that look the same may in practice do different things.

Comparability of project results:

Comparability of project results is more important than interoperability, in order to extract knowledge that is applicable to other situations.

It is more difficult to compare data from different pilot sites but as a prerequisite a provider should ensure interoperability between test sites, so interoperability and comparability are tightly linked.

One of the problems with regard to comparability of data is that sometimes we are too focussed on getting positive outputs, not being rigid enough in applying methods and taking a scientific approach, which makes it hard to perform a meta-analysis afterwards in order to compare what actually works and what not. An example could be measuring the amount of fuel saved in different pilots using different systems.

We have to be aware that laboratory studies are very different from field studies in transport. In transport, you cannot produce the same situations as you can in labs. Conditions cannot be reproduced from one country or city to another – you will have similar cases but they won't be the same. A comparison was made with medical studies where there are carefully described procedures and methodologies, although there are also a lot of variables that cannot be controlled - just as in traffic.

The question was raised whether there is a need to try to have a uniform kind of applications to make data comparable. This question was answered negatively: the pilot projects are piloting applications, we first need results, we can compare later. If we don't have results, we don't know whether the applications work.

As we want to acquire knowledge about cooperative systems, it is important that the applications used in pilots are different, and that the pilots are well designed, executed and analysed. Knowledge should be comparable, not just data: from each FOT we want to learn something new and this knowledge needs to be shared. In other words: accumulating knowledge, transferring experience, and sharing knowledge; this is the aim of FOT-Net. At EU level best practice lies in diversity of experimentation.

Sharing data and results:

Performing meta-analyses, comparing results and sharing data require coordination, for example by support actions or a special project. Timing is an issue, as many projects run in parallel. Data-ownership is another obstacle. The EC could have a role to play in this: individual projects are like small companies, and they will only share what is in their own project's interest. Projects are also not funded for 100%. The outcomes of pass-or-fail tests of products are also very secret information in the industry.

Guidelines are needed for data-sharing and comparing results, especially for new projects. There are some guidelines, for example from FOT-Net, but they are not always applied.

Developing business cases:

One of the main goals of pilots is to show how well applications work so people are willing to invest in them. This means that you have to spend a lot of effort in proving that it is working. However, in order to prove that some result is statistically robust you need to accumulate a lot of data. This type of statistical analyses of the results is often missing due to lack of time and resources. The main questions are:

- Does the system work?
- Does it work always, everywhere, for everyone?
- In the pilot phase, you need some proof, but in the deployment phase you need much more.

One way out of these dilemmas is to perform meta-analyses of results from multiple projects.

How can I learn something from the application? How many vehicles should I count to have benefits? This has an impact on the interoperability of systems. Car makers won't go for interoperability of functions, because they want to differentiate. With a different set of data can I count on other brands to have data that is useful for me? Interoperability is good between platforms, not necessarily between functions. Therefore interoperability is good at a certain level, but differentiation is more important at other levels. For functions we are still experimenting and we will need differentiation. We could define a limited set of applications at function level that will allow us to evaluate rather than benchmark. For this we need a clear, detailed description of functions, and to use a common terminology. We may also need to look at interoperability from the end-user perspective.

Pilots prepare for deployment and this is about user acceptance and adoption. There are methodologies for evaluating these aspects (e.g. TeleFOT developed one), and some projects (like DRIVEC2X and FREILOT) are evaluating user acceptance.

Testing interoperability

The questions about testing interoperability are answered differently depending on the project objectives. For projects with multiple sites, cross trials need to be organised in order to ensure that applications work in different contexts. Interoperability can also be ensured by design, if a common architecture is used for all applications to be tested in a FOT. When standards are used, applications should be, as a speaker called it, "fundamentally interoperable".

Plug-tests are another way of finding out about interoperability. Several projects have organised such events, where people can test whether their applications are interoperable.

In conclusion it is important to address interoperability in every pilot, because they are about cooperative systems and communication between systems all over Europe, and even globally, is needed.

7 Session 2 – Data sharing

The questions addressed were:

- What can we gain from exchanging data?
- Which data should be shared between pilots?
- Are the pilots willing to share data?
- How can we put data sharing into practice?

Helena Gellerman (SAFER) moderated this session. She emphasised that cooperative systems push for solutions on data sharing issues. Vehicle manufacturers sell products globally; so standards are needed. For cooperative systems we have to focus on the kind of messages that are exchanged and how they are interpreted.

The following issues turned up in the discussion:

Data

When we speak about data we may mean different things. Data may be the result of a study, but they may also mean technical data. Data coming from studies are useful for other types of studies, such as (micro-)simulation studies, to validate and calibrate simulation models.

Legal aspects

A lot of effort is required to comply with legal documents, and to get people to sign consent forms. Whether you can exchange data with others depends on the kind of data, what participants have consented to, legal requirements and what is written in the consortium agreement. It is important that new projects benefit from previous projects and that they bring this knowledge into the design of their consent forms, consortium agreement, etc. - e.g. UDRIVE has addressed data sharing in their consortium agreement to be able in the future to share the data.

When we talk about cooperative systems, data are broadcasted by the vehicle to the outside world: there are legal issues stemming from the use of these data for one's own purpose, and data should be protected. You are not necessarily allowed just to use the data that are out there. Data sharing is part of the business, but data should be cleaned from elements that make personal identification possible.

Gains from sharing data

Pilots are take place in different parts of Europe, and projects are often exchanging data between pilot sites. One idea is to have some kind of project that actually brings together the key players from the different projects that is funded, to look at the data exchange and at the knowledge gained from the different pilots.

If a repository of data, figures, facts, etc. was available and well-maintained, stakeholders would use it.

Some speakers object to the idea of exchanging data. In the projects they are more interested in the data itself than in the process of exchanging the data. One of the reasons for reluctance to share data is that people know how poor their data is. The data is OK for the analysis done in the project, but the quality needs to be improved, if it should be used for a more general purpose. In most projects, there is no additional money left to take this extra step.

If you know that other people are likely to see your data, you will improve the quality of your data, even if you don't end up sharing at all.

Storing data and making them accessible to others:

It is not always easy to know what data are worthwhile to keep for posterity. For example in the UK you have to specify the purposes for which you are storing data. It is often not necessary to store confidential data.
It might be useful to have a project that decides which data is useful to keep and to share, but it may not be possible for just one group to determine what is useful for posterity.

In projects there is usually not enough time to clean the data in order to be able to reuse it. For example in FREILOT they tried to log everything and make it available. However, if you don't know exactly what the data represent it may be useless. There may be so many exceptions in your data that you should have a

good understanding of what the exceptions are, for example wrong GPS data due to reflection.

It would be nice to have a matrix that describes the activities of each FOT and that one could look at to see what each project is doing, where there are similarities, what one can look at, and what one can share. In the FOT-Net data sharing seminar one of the findings from the discussion was that, in their design, FOTs can be so different that you have to be careful when comparing data. The FOT-Net wiki doesn't compare but lists project features.

We have to be aware of bad comparisons. To know the way in which data were collected is also extremely important, else you cannot really compare.

In the development of the FESTA methodology, it was proposed to have a minimum common set of data that is collected in order to be able to do meta-analyses, and to agree on which kind of data should be exchanged. However, this idea was rejected, as the whole FOT/NDS area was quite new in Europe and the focus was on learning how to collect and analyse the data. Knowledge and trust was not mature enough.

It was concluded that data sharing is possible. Often partners are the same in different projects: this also helps in sharing data. If we could form a project (with people who have experience in FOTs and pilots) that could try to define a common technical platform, this would represent a step forward to deciding what data have to/could be shared. It would also be good to have a meta-analysis project. The costs of having the experts brought together and performing this meta-analysis are nothing compared to running an FOT.

For data sharing you have to define what kind of data is useful for posterity and define standardised ways to share data. New projects should be required to share their data.

The FOT-Net International Workshop at the ITS World Congress 2013 in Tokyo will address data sharing. Japan and the US are interested in data sharing from a cooperative systems' point of view.

8 Session 3 – Deployment & business plans

The questions addressed were:

- What will be achieved in terms of deployment at the end of the pilot?
- Should pilots join forces for promoting each other's successful deployment?
- What can be reused from your deployment experience?
- What added-value could a community of pilots bring?

Tom Alkim (RWS) moderated this session. Some issues raised in the discussion were as follows.

Need for roadmap and strategy;

We miss a roadmap to deployment from the results of projects. Deployment is just left to the market or the partners. There should be a mechanism to help this take off.

For deployment you need commitment and resources: partnerships are needed to agree on a common investment plan.

Deployment is a competitive process: the better service gets the most customers, and eventually the service will be deployed all over Europe.

Deployment might start with entertainment services.

Sharing deployment activities:

It is good to learn about the others' successes and pitfalls, and stakeholders are interested in hearing the stories, but it will only work if the involved parties are willing to share these stories. Consortium agreements and other contractual obstacles may prevent this from taking place.

When pilots have results there is an interest in broadcasting them as widely as possible and it could be interesting for other projects to share that broadcasting and interest, and to convince potential buyers. We should think more about how projects may work together in their exploitation phase. Showing that something works makes the beginning of deployment easier.

For the different ways in which the projects work on deployment, the presentation slides available at the FOT-Net website provide more information.

In conclusion it is clear that deployment is not going to happen by itself, stakeholders need to be brought together and a critical mass of clients such as cities, authorities or operators are needed.

9 Closing remarks and next steps

Wolfgang Hoefs (European Commission DG CONNECT) concluded that we need to breach the gap between FOT, pilots, and the phase of deployment. FOT-Net has an important role to play and has the full support of the EC within this framework. It is an important tool to prepare for the deployment measures that need to be taken.

Interoperability is an important issue and we have achieved a lot in the past. FOT-Net is a good platform to discuss these issues. There is not only a European dimension to the issue, but also national and international ones. The EC is currently looking into further steps on data sharing, also in cooperation with the US and Japan - especially on probe data. A small European study will be started by FOT-Net on this issue, in collaboration with the iMobility Forum.

Wolfgang Hoefs concluded by emphasising the open data access policy of the EC. It is expected that this will have an impact on future projects on how contracts are concluded. Open access will be implemented in the future. It was noted that it is already difficult to share data within the EU so it might be difficult to share with the US. However, USDOT has a clause in project contracts that data have to be made available for research.

Maxime Flament (ERTICO – ITS Europe) wrapped up the workshop by concluding that FOT-Net is committed to data sharing, all the more since it has a working groups looking into how data sharing may be facilitated. In the FOT-Net International

Workshop which will take place in Tokyo on 13-14 October, data sharing will be at the centre of the attention.

In his concluding slides a summary of the discussions of the day may be found.

All presentations are available at the FOT-Net website.