TEAM Project Presentation

1st MyWay Collaboration Workshop
Andreas Schwarz, EICT
Fraunhofer FORUM Berlin, 20.05.2015
Vision

Achieving always optimal mobility conditions.

Targeting

- **Users**: Encouraging collaborative behaviour of travellers and drivers.
- **Infrastructure**: Making infrastructures adapt pro-actively and in real-time based on user needs.
- **Communication technologies**: Combining automotive communication systems with cloud technologies.
Mission

Turn static into elastic mobility by balancing needs.

**Collaboration** is the key concept.
It extends the cooperative concept of vehicle-2-x systems to include interaction and participation.

Make travellers and drivers, vehicles and infrastructure act as a **TEAM**

- Adapting to each other
- Adapting to the situation
Motivation

Vehicles and infrastructure already communicate...
Motivation

Smart phones and cloud services will be connected, too.
Motivation

Next: Collaboration integrates and balances all stakeholder needs.
Approach

Four paradigms define the research concept.

(1) Elastic mobility
   means a shift from a reactive traffic management to an permanent adaptive and collaborative traffic management.

(2) Window of interaction
   refers to the real time needs of human decision making process between 5 seconds and 5 minutes.

(3) Participation
   considers the needs and behaviours of road users in the technical systems of intelligent transport solutions.

(4) Collaboration
   extends the cooperative concept of vehicle-2-x systems by integrating the user into a highly interactive and participatory network.
### Innovations

**Building the elastic mobility management system.**

<table>
<thead>
<tr>
<th>Communication</th>
<th>Converged communication channels.</th>
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<tbody>
<tr>
<td>Infrastructure</td>
<td>Distributed sensing and “best effort” balancing of needs according to local policies.</td>
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<tr>
<td>Data</td>
<td>Consolidated sensor input available in real-time.</td>
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<tr>
<td>Applications</td>
<td>Novel collaborative applications interconnected through automotive cloud.</td>
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<tr>
<td>Traveller/driver</td>
<td>Active participation and collaboration.</td>
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</table>
Objectives and work plan

Technologies and users interlinked.

| Create basic technologies | • Advance vehicle-2-x systems with LTE technologies.  
|                           | • Develop an automotive cloud-computing platform. |
| Integrate infrastructure-centric technologies and algorithms | • Develop proactive infrastructure-centric algorithms.  
|                                                               | • Enable behavioural change taking into account real-time needs and constraints. |
| Demonstrate distributed technologies and algorithms | • Develop proactive user-, community- and group-centric algorithms.  
|                                                               | • Realise massively distributed collaborative control and optimization concepts. |
| Evaluate the European scope | • Conduct the pan-European Euro-EcoChallenge to demonstrate and evaluate TEAM results. |
Stakeholders

Stakeholders are essential for the key concept of collaboration.

TEAM stakeholders

- can detail use case identification, requirements and state-of-the-art analysis,
- establish a continuous dialogue to validate and improve designs and development,
- support the final evaluation,
- support deployment and exploitation.

The stakeholders are

- researchers/ related projects
- car manufacturers
- suppliers
- telecommunication providers
- road infrastructure operators
Expected results

**Improving transportation safety and efficiency, Implementing environmental aspects**

- Novel distributed sensing and "best-effort" balancing algorithms.
- Cloud-based local dynamic map services and associated communication technologies.
- Off-board telematics services and in-vehicle smart phone integration.
- Coaching mechanisms for safe and green driving and travelling.
Applications

Infrastructure.

(1) Collaborative urban monitoring and ad-hoc control
can monitor urban roads and recognize incidents or special events while driving

(2) Collaborative co-modal route planning
provides end-users with alternative routes and transportation modes based on their preferences

(3) Co-modal coaching with support from virtual/avatar users
creates a “virtual” coach (avatar) for end users- comparing true costs, travel times, CO2 emissions and more
Applications

Infrastructure.

(4) Collaborative smart intersection for intelligent priorities

optimizes traffic flow at intersections, includes priority to certain vehicles (i.e. buses), synchronization of traffic lights, speed recommendations

(5) Collaborative public transport optimization

works towards adaptive bus scheduling, based on input from travellers (transmitted via Smartphone)

(6) Collaborative dynamic corridors

establishes corridors i.e. for heavy vehicles (certain lanes could be reserved for trucks to deliver goods more efficiently)
Applications

Travellers & drivers.

(1) Collaborative adaptive cruise control
Adapts vehicle speed to optimize traffic, reducing velocity deviations and fuel consumption

(2) Collaborative eco-friendly parking
Enables TEAM vehicles access to real time information about parking availability (on- and off-street), balancing local demand

(3) Collaborative driving and merging
Addresses challenges in the collaboration among vehicles (fast lane changes, roundabout driving, emergency braking etc.)
Applications

Travellers & drivers.

(4) Serious game and community building
creates a gamified environment where drivers and passengers can share their information, learn proper driving styles, receive incentives to support collaborative behaviour

(5) Collaborative eco-friendly navigation
merges all information (from road users, traffic data, infrastructure) to create collaborative eco-friendly routing and navigation
Infrastructure stakeholders’ involvement

Including major municipalities from the beginning.

**Germany** – Berlin
Co-modality test in the large scale public transport system and urban traffic management applications.

**Italy** – Turin and Trento province
Verification of the TEAM service continuity for the travellers and drivers community.

**Sweden** – Gothenburg
Trials of interurban applications and vehicle to vehicle communication.

**Greece** – Athens and Trikala
Test and demonstration of all FLEX applications.

**Finland** – Tampere and Helsinki
Integration of DIALOGUE applications into real world infrastructure data.
Euro-EcoChallenge

The test set-up for components.

- Technology and performance test of all components and applications.
- Instructed users will test the TEAM developments.
- Challenges for TEAM application users (mainly drivers and travellers) to demonstrate the behavioral changes.
- Demonstration of results
Workflow

SP1 MANAGEMENT

- applications
- enablers

SP3 FLEX: infrastructure-centric technologies

SP2 EMPOWER: advanced technologies

SP4 DIALOGUE: user-centric technologies

SP5 EVALUATION: Euro-EcoChallenge

SP6 SUPPORT: dissemination and standardisation
Milestones and timeline

- M1.0 Use cases defined
- M2.0 System requirements
- M3.0 System specification defined
- M4.0 Basic system and enablers integrated
- M5.0 TEAM applications integrated
- M6.0 Euro-EcoChallenge conducted
- M7.0 Exploitation measures agreed

Duration 48 months, November 2012 – October 2016
Team facts

Duration: 48 months
November 2012 – October 2016

Total budget: 17.1 m€
EU funding: 11.1 m€

Coordinator: Fraunhofer FOKUS, Dr. Ilja Radusch
Consortium: 28 partners
7 support partners

This project is co-funded by the European Union
Consortium

Automotive

ICT

Infra-structure

Research

Other

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TEAM collaborations

Selected liaison and interaction partners and projects

- FUCAR
- VMZ
- 4D
- BVG
- DRIVE2
- THE CITY OF TAMPERE
- CONVERGE
- Liikennevira
- My Way
- MOBiNET

TEAM Project Presentation
Thank you!

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### Project structure

<table>
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<th>Subproject</th>
<th>Tasks</th>
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<tr>
<td><strong>SP1 MANAGEMENT</strong></td>
<td>Project coordination</td>
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<tr>
<td><strong>SP2 EMPOWER</strong></td>
<td>Basic technologies (e.g. advancements in communication technologies and cloud-based services) to realise collaborative mobility</td>
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<tr>
<td><strong>SP3 FLEX</strong></td>
<td>Infrastructure-centric technologies and algorithms for elastic mobility</td>
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<tr>
<td><strong>SP4 DIALOGUE</strong></td>
<td>Distributed technologies and algorithms to realise elastic mobility</td>
</tr>
<tr>
<td><strong>SP5 EVALUATION</strong></td>
<td>Conducting pan-European Euro-EcoChallenge</td>
</tr>
<tr>
<td><strong>SP6 SUPPORT</strong></td>
<td>Dissemination, exploitation, business modelling, stakeholder forums</td>
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