ELVIRE

ELectric **V**ehicle communication to **I**nfrastructure, **R**oad services and **E**lectricity supply

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PERIODIC PROJECT REPORT: PERIOD 1
PUBLISHABLE SUMMARY

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PUBLISHABLE SUMMARY

I. Deliverable State

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			X

II. Revision History

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1.1	Continental Automotive GmbH ERPC GmbH	ELVIRE Coordinator: Hannes Lüttringhaus ELVIRE Project Manager: Gloria Pellischek ELVIRE Work Package Leaders	Final reviewed version	2011-05-31

III. Reference to Other Documents

Doc #	Document Title	Purpose / relationship

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Read access											
Write access											

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1/ PROJECT ABSTRACT AND OBJECTIVES

The rationale of this project is to contribute significantly to neutralize the driver's "range anxiety" and encourage the customers to embark the fully electric road transport. Therefore the objective of "ELVIRE" is to develop an on-board electric energy communication & service platform for realistic use-cases including the relevant external communication and services. For this purpose the following actions will be taken:

- select representative use-cases according to realistic scenarios and business-models
- identify & develop those off-board ICT & services needed to comply with the use cases
- develop "Prototypes" for the on-board Communication and E-energy service unit
- verify all integrated sub-systems on prototype level and demonstrate the proof of concept.

Great emphasis is placed on the "openness of the Electricity-service platform" granting access to multiple players maintaining the customers' choice.

ELVIRE is structured into 5 work packages, with:

WP 1000   covering the project administration, legal aspects and dissemination and the inclusion of complementary RTD

WP 2000   defines relevant mission data for the use case in consideration of technical and commercial aspects

WP 3000   addresses the external E-Service provision and the necessary E-IC instruments

WP 4000   develops the e-communication device and the OEM-neutral universal on-board E-communication and service platform

WP 5000   conducts integration and usability tests and the overall system validation.

WP 1000 OBJECTIVES - ELVIRE GOVERNANCE

- Conducting all activities regarding the planning, co-ordination, and monitoring of the project, as well as the dissemination of project results and reporting to the European Commission.
- Identifying relevant Data Protection & Privacy concerns
- Establishing links to complementary RTD on E.V.s in other projects, as appropriate and screen standards as to the project results, as well as developing and pursuing a special dissemination plan to guarantee wide industrial acceptance of the results.

WP 2000 OBJECTIVES - SERVICES & BUSINESS MODELS

- Describing the most appropriate scenarios for E.V. operation and to derive the respective requirements for the on-and off-board systems
- Developing the corresponding business models
- Identifying the requisite service needs and define the related stakeholder interaction.

WP 3000 OBJECTIVES - SERVICE PROVIDER ICT & PROCESSES

- Defining the requirements core functionalities for an effective Control and Management Centre
- Establishing the prerequisites regarding the Communication of the E.V to the Charging Infrastructure
- Developing the new mobility services and roaming requirements for e.g. finding and booking available sockets along the voyage
- Elaborating the necessary data authenticity needs
- Building the link to the E-energy providers via an efficient communication system.

WP 4000 OBJECTIVES - ON-BOARD COMMUNICATION UNIT

- Developing a new E-energy car communication device as an open platform enabling different vehicle concepts to be covered.
- Development of the respective on-board services for reliable and safe E.V. operation.
- Designing and manufacturing of early and advanced prototypes for each of the aforementioned activities.

WP 5000 OBJECTIVES - PROOF OF CONCEPT, TEST & VALIDATION

- Submitting all developments and prototypes of WP 3000 and 4000 to tests according the conditions defined in WP 2000.
- Integrating the most advanced solutions and running a final proof-of-concept validation.

2/ SUMMARY OF THE WORK PERFORMED SO FAR AND MAIN RESULTS

WP 1000 SUMMARY - GOVERNANCE

Task 1100: Organization and execution of the project kick-off meeting and establishment of the project budget tool via EMDESK; conduction of the 1st Steering Group Meeting; monitoring of progress during ample workshops against the TA & respective Commission Communication;

Task 1200: Advising on privacy & security aspects in context of the set-up of the project storyline and data authenticity

Task 1300: Creation of the project's website; publication of the first press release; Development of a community of interest, Coordination with the partners' communication teams and definition of the dissemination plan (D1300.3). Screening of standards and discussions regarding the connection to the grid, as well as participation in standardization group regarding communication protocols.

WP 2000 SUMMARY - SCENARIOS & BUSINESS MODELS

Task 2100: Detailed definition of scenarios and use cases from the point of view of the average EV driver, aimed to reduce drivers' range anxiety and promote wide-spread use of EVs, taking into consideration the energy services needed to support the driver on his journey.
Results of the work done in this task are detailed in deliverable D2100.1&2 – Requirements and Scenarios Definition document.
D2100 & 2 document submission to the EU Commission on time.

Task 2200: The deliverable D2200.1 presents a preliminary evaluation of the impact of Electric Vehicles to the current automotive industry business model. The focus was mainly on car manufacturers to test the common framework to analyse the topic area. Relevant literature was summarised, interviews were conducted with industry experts, which analyse the business models related to findings from D2100.1&2. The findings and common business model framework will be used to evaluate further stakeholders in the Electric Vehicle industry, such as utility companies, suppliers, infrastructure providers.
The internal Deliverable Report D2200.1 for month six was handed in on time.

Task 2300: Mapping of relevant stakeholders in the EV ecosystem. Analysis of each stakeholder's role in the value chain, their contribution to the overall solution and interdependencies between stakeholders.
Results of the work done in this task are detailed in deliverable D2300.1 – Stakeholders Analysis Definition document.

WP 3000 SUMMARY - SERVICE PROVIDER ICT & PROCESSES

Task 3100: Analysis of use cases defined in WP2000, with regard to the implementation of the **C**ontrol & **M**anagement **C**entre (CMC). Definition of system boundaries and scope, definition of CMC roles and architecture, identification of dedicated data interfaces and interfaces to internal services components – Demand & Grid Prediction module and the Mobility and Roaming Services.

Task 3200: Analysis of the communication between charging components and the electricity infrastructure supporting the EV services given to the driver. The infrastructure includes charge spots, allowing recharge of the vehicle's battery, based on a managed 'smart charge' program, and battery switch stations, allowing quick battery replacement extending driving range without having to wait for the battery to recharge.

Task 3300: This Task analyses possible new e-mobility services and billing of charging events. If electric vehicles are to gain acceptance, users should have the possibility to charge their car battery at whatever charging station available, regardless of which provider operates it, and receive one monthly bill coming from the service provider.

Task 3400: Analysis of use cases defined in WP2000, with regard to the implementation of the Communication Management Platform (CMP). Definition of CMP roles and architecture, and interfaces to external service components

Task 3500: Requirements analysis for the interface between the CMP and the utility. Preliminary system architecture and data model for the utility.

WP 4000 SUMMARY - ON-BOARD COMMUNICATION UNIT

Task 4100: Requirements analysis and specification of technical requirements of the EVCD, as well as first development of most effective EVCD concepts, to handle and process EV internal and driver defined data, as well as to manage the interaction with the external E-service infrastructure. Starting point for definition of the required information exchange between driver, the E.V., as well as service providers, represents the analysis of use cases (result of WP2000). Based on this background information, the information to be exchanged between system components to be developed within the scope of T4100 and system components and services to be developed within T4200 and WP3000 were defined by sequence diagrams and business-object models. Moreover, technical requirements of the EVCD communication interface, as e.g. standard interface technologies for information exchange, were analysed and defined. The specification of required software services and concepts, including a first specification of the system architecture is in progress.

Task 4200: The EV-ICT Service Unit is the on-board device which provides all the technical capabilities (hardware, software) to provide the EV services. In order to define all relevant technical requirements the Task 4200 first concentrated on the thorough analysis of the use cases and the results of WP2000 (Master Story Line) to gain insights into the system usage and the expected system interaction from a user perspective. The daily experience of the EV user was described in great detail in form of relevant use cases. The task successfully completed the specification of services which need to be implemented (D4200.1) and the associated Milestones, incl. Hardware Platform selection. In addition the most promising hardware and software system and also requirements for the needed algorithm development and required data sources were identified. The chosen platform is based on a pre-production sample of a Conti standard product which allows re-use some state-of-the-art functionality, such as e.g. navigation software. It is already clear that the existing functionality has to be extended in several aspects, especially in the areas of algorithm development and driver HMI in order to comply with the set of defined use cases. The completion of these specifications (D4200.2) falls into the next period.

WP 5000 SUMMARY - PROOF OF CONCEPT, TEST & VALIDATION

Task 5100: Draft document on testing terminology and initial discussions on the first deliverable (D5100.1).

Task 5200: No activity in this Task during the reporting period

Task 5300: At the ELVIRE Steering group meeting in Paris in October 2010 it was agreed that this third task (T5300) should be added to the WP in order to formally enable demonstration activities with their special funding ratio. Further to this, discussions on final demo location and prerequisites have been held and an assessment has been conducted. The work has resulted in a draft decision support document.

3/ FINAL PROJECT RESULTS AND THEIR POTENTIAL IMPACT

ELVIRE will become crucial to future electric road transport by closing the gap between vehicle technology and the off-board E-ICT and service environment. Therefore it will have strong impact by strengthening competitiveness, energy efficiency and reduce emissions and improve by promoting electrification. Beyond this global statement the overall project result are defined by the outcome/deliverables of its individual Work Packages:

ELVIRE GOVERNANCE (WP 1000)

Apart from an effective project operational and financial administration this WP delivers the establishment of the complementary legal assessment of all privacy related findings, as well as the inclusion of the respective standardization features, the bridge towards other related RTD projects and the public interface (dissemination/website).

SERVICES & BUSINESS MODELS (WP 2000)

WP 2000 identifies the drivers' mobility needs and sets them in perspective to the use limitations of electric vehicles. Thereby it delivers to other Work Packages a framework of input data regarding the stakeholder interaction, as well as the required tools and business processes that are necessary for the mass adoption of e-Mobility. Major Deliverable will be the definition and continuous updates of the "Use Cases"

SERVICE PROVIDER ICT & PROCESSES (WP 3000)

In close collaboration with WP 2000, this WP develops an open platform to provide a variety of externally based services (WP 2000) that balance between the user requirements and the energy availability. Further to the objective of this WP it will deliver a process manual to guarantee the driver's optimum mobility by ensuring seamless and real-time data exchange between the user, the vehicle, the service provider and the grid. Essential deliverables of this WP are the implementation of the "Management Control Centre", the communication mode with the charge grid and the respective utilities, as well as the secure communication with the on-board systems of WP 4000.

ON-BOARD COMMUNICATION UNIT (WP4000)

This WP develops the necessary electricity IC-unit in context with the respective in-vehicle services, which will channel all information to and from the driver and the service provider. This includes the provision of necessary methods and algorithms in form of a sample hardware platform and advanced software. It creates an optimum interaction and information exchange between driver, vehicle towards the external service provider and the utilities. The main deliverables of this WP will be the on-board prototypes for the brand-neutral E.V. Communication Unit (EVCU) and the E-Energy ICT Service Platform.

PROOF OF CONCEPT, TEST & VALIDATION (WP 5000)

The WP deals with the verification, validation and demonstration of the system developed in the project. The verification testing will assure that sub – systems interact in a proper way and meet requirements, whereas the validation test activities will control that the correct solution has been developed from a user perspective. Finally, the full system proof of concept will be showcased in a demonstration including the on – board system integrated in electric vehicles and connected with the service provider infrastructure.

The single prototypes from all WPs will be integrated and tested on sub-system and system level, thus making sure that the seamless interaction of hard- and software is guaranteed. The final proof of concept will be a full prototype subject to realistic use conditions, which in turn will be the most outstanding deliverable of this WP.

ELVIRE will quickly deliver:

- a brand-neutral on-board communication hub and user interface which will enable real-time and interactive cooperation between the EVs and the off-board service providers,
- a complementary off-board service and management layer that is open to participation of ample service contractors, and which maintains the customers' choice and respects the privacy and security of the citizen.

The rapid creation of a highly efficient and open EV vs. E-infrastructure interface through ELVIRE is an essential corner stone to customer confidence (relieving "range anxiety" & protecting privacy) and promoting market introduction and penetration. Because of the upfront stage of development, the impact of ELVIRE can be estimated in quantitative terms, only, as the situation is by-and-large unparalleled but there are undoubtedly clear expectations:

- impact on competitiveness because ELVIRE supports shifting European industry to the leading edge of EV development
- impact on environment and emission reduction, since ELVIRE promotes electric drive, which is of remarkably higher efficiency compared against ICE propulsion.
- impact on energy security, since ELVIRE supports the feasibility of E-mobility, which is aimed to be rooted on regenerative sources, such as wind, solar, and/or hydropower,
- impact on security, since ELVIRE triggers measures to preserve the privacy and security of the citizen moving in the E-mobility environment, at early stage
- impact on international collaboration, since the European automotive industry and their allies are able to maintain their strong position in global partnerships.

4/ ELVIRE WEBSITE

The first version of ELVIRE's Website can be found under:

http://www.elvire-project.org

The new version of the project's website, which will be launched soon, will be available at:

http://www.elvire.eu

As a matter of fact, visitors to the start-up version of the website will be automatically redirected toward the new one.

5/ CONTACTS

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