# Future telematic services for Electric Vehicles

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## 1. Abstract

The Electric Vehicle represents an excellent opportunity for introducing telematic services into automotive sector. Moreover, satellite-based Intelligent Transport Systems (ITS) are an important component of the global answer to the challenge raised by increased personal and freight mobility. The continuity, accuracy and availability provided by GNSS-based fleet management applications open the possibility of reducing the negative impact of road transport while offering new services to a wide range of transport actors.

The GMV Company and the University of Valladolid have joined their efforts in order to explore the potential of PALVIEW®, an open, robust and scalable technical platform integrating a large number of telematic services. In particular, this article focuses on the analysis of current telematic services and their future evolution once the advent of the Electric Vehicle is a reality. The generalization of such applications is crucial for the improvement of the mobility of the users of electric vehicles that will promote their demand.

## 2. Present and future of Telematic Services

The GMV company, that has been involved in the development of ITS systems (in particular Fleet Management applications) since 1997, started the provision of a fleet management service on an web scheme (based on ASP.NET technology) in February 2005 that has resulted in a major success for GMV. This service, called MOVILOC, is based on the PALVIEW® platform, developed entirely by GMV.

This platform allows a vary group of telematic OBUs (On-Board Units) to wirelessly send information to a control centre, where this information is processed and stored. The type of information is very diverse, going from PVT (Position, Velocity and Time) to different sensor data (temperature, tamper detection, diagnosis information, etc), since the philosophy to follow is One OBU – Multiple Services [1][2]. That is, one single type of OBU is able to provide information for very different telematic

services like eCall, Pay as You Drive, Electronic Toll Collection, Road Use Charging, Floating Data Car, remote diagnosis, etc.

The main features of PALVIEW® are the following:

- An ASP.NET mode service where end users use a thin client (Internet browser).

- PALVIEW® is a modular platform that differentiates layers depending on the final users.

- PALVIEW® allows the development of other applications by third-party integrators, thanks to an interface based on Web Services provided by the platform to access the stored information.

- Finally, PALVIEW® can integrate various types of mobile devices, including those in this tender, developed and manufactured by GMV.

According to these features, the main advantage of PALVIEW® is that very different services can be quickly developed using a common platform as a core, thanks to the modularity and the interfaces provided by PALVIEW®. During these years GMV has developed several PALVIEW®-based services, like a fleet management system (Moviloc [2]) and ETC and Road User Charging services [3, 4, 5 & 7], etc.

The basic approach for this article is to make use of this common infrastructure (PALVIEW®), which will provide support to all planned services together with specific applications, to develop a new service that, starting with the computed PVT (Position, velocity, Time) information coming from the different mobile units, will generate the risk map related to each user for the calculation of their driving profile. In such way, the service will automatically analyse the stored PVT information in order to present clear reports both in HTML and EXCEL format regarding issues like fatigue report, driven distance, etc. These reports may be requested under demand or automatically generated and sent via email to the service operator.

The advent of the electric vehicle has brought the appearance of new telematic services. Although these applications are not explicitly needed by electric vehicles, they will help for the mobility of such vehicle. The autonomy of an electric vehicle is limited so that it is necessary to connect the driver to a remote centre where different information can be obtained. This data is diverse but mainly belongs to the following service.

- Battery Status: in-car information that shows the driver the level of the state of charge of the battery and, in case of low level, sends an alert via SMS to the driver.

- Location of nearest charging point: refer to the location of the nearest charging point and its availability at the time when the driver wants to recharge the car.

- Parking/Charging point remote reservation: drivers are able to reserve a parking slot with a charging point in advance. This makes more comfortable the charging process.

- Car sharing: electric vehicles will bring new model for buying a car. Rental and leasing schemes for owning an electric vehicle will be more demanded. Maintenance cost are lower in

electric vehicles, however, the battery expenditure will follow a rental model that will make more attractive these schemes.

GMV is being developing all these services in order to be capable of offering them when the electric vehicle will become a reality.

## 3. Conclusion

This contribution is based on an existing technical solution, PALVIEW® a horizontal common platform, which allows serving other applications that will lead to new services in the near future with the advent of the electric vehicle. In particular, car rental companies can take advantage of the information generated by the platform, enabling the concept of Electric Vehicle Flexible Rental.

To achieve it, no special OBUs are required, since the philosophy "one obu – multiple services" allows to offer these features within all the provided functionalities. Therefore, the tests were carried out with equipments already installed in vehicles belonging to different fleets.

The advantages of a system of this kind of services are clear, but also for determined vehicle owners, since they can benefit from flexible charging schemes if their usage of the car use such telematic services.

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