

An analysis of electric vehicles to optimise the in- and out-of-car experience

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An international research team led by the Universidad Miguel Hernández (UMH) in Elche, Spain, has been working to acquire, pool and develop knowledge on various aspects of electric and hybrid vehicles, such as vehicle dynamics, drivability, and noise, vibration and harshness (NVH). Brought together under the European COST Action TU1105, the aim of the four-year project was to propose and develop new analysis techniques and tools for use at the design stage of electric vehicles in order to address the specific challenges they pose.

The project was carried out in three phases. In the first the aim was to ascertain user expectations regarding this alternative vehicle type. The second and main body of work was focused on the study of traditional techniques for noise and vibration analysis, and how they might be adapted for use in the hybrid and electric context. The final block of work comprised the analysis of the results from the previous two phases in order to optimise the design of hybrid and [electric vehicles](#), including improving their detectability on the roads by pedestrians, cyclists and other [road users](#).

Among the results of the project, the researchers identified the main challenges posed by the arrival of electric and hybrid vehicles on the roads. They also proposed new experimental and simulation techniques for application at the design stage in order to better predict and take into account parameters such as acoustics, vibrations and comfort. The international team of researchers went on to define future lines of research that will enable the European automotive industry to develop

vehicles which combine excellent in-car comfort for drivers with optimal safety for pedestrians and other road users.

COST Actions are efficient networking instruments funded by the European Commission to enable researchers, engineers and scholars to cooperate and coordinate nationally-funded research activities at a European level. They cover scientific and technological research activities for peaceful purposes and of public interest. In this case, the action was devised to bring together a fragmented knowledge base on the subject of electric and hybrid vehicles, whose various characteristics (noise emissions, vibration and comfort) are very different to those of traditional vehicles.

Some of the peculiarities of electric and [hybrid vehicles](#), for instance, derive from the absence of an internal combustion engine, which make the experience of both driving them and encountering them on the roads very different to traditional motor vehicles. On the one hand, the lack of engine noise inside the car means that other, low-intensity sounds and vibrations become annoying to drivers. On the other, the relative silence with which the vehicles move about mean they often catch pedestrians, cyclists and other road users unawares, leading to potentially dangerous situations.

Provided by Asociacion RUVID

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