Climate control innovation extends range of electric vehicles

Substantial amounts of energy are required to run auxiliary systems within electric vehicles, which is a major drain on the battery and so limits the range of the car. We spoke to **Dr Nino Gaeta** about the Xeric project's work in developing a new climate control system, which could help both maintain passenger comfort and increase the range of electric vehicles

The range of most electric vehicles today is typically quite low, at somewhere between 200-300 kilometres, which discourages many drivers from switching from conventional vehicles. Researchers in the Xeric project are developing a new system which could help to improve energy efficiency and so increase the range of electric vehicles, as project coordinator Dr Nino Gaeta explains. "We're developing a new climate control system, based on new technology, which will limit the need to use the battery to control the micro-climate inside a vehicle. By using less energy from the battery to control the climate, we can increase the range of a vehicle," he outlines. The system absorbs humidity from the air, using dessicants and a membrane contactor. "The humidity in the air is captured at the membrane interface, so dry air is circulated in the car. This reduces the amount of energy required from the battery to de-humidify the air," explains Dr Gaeta.

This is often quite a major burden on a car's battery, an issue which researchers in the project are working to address. The project's work is quite multi-disciplinary in scope, bringing together researchers from several different areas. "The project combines expertise on membranes, dessicants, climate control, and traditional operations systems. In the contactor, we combine a membrane, dessicant, and traditional cycles, to de-humidify and cool air," says Dr Gaeta. Whereas a traditional climate control system condenses water, in the Xeric system water is effectively taken away using the dessicant. "The membrane is between the dessicant and the air, and acts as a contacting surface. It doesn't allow liquid water to pass through it, but it allows liquid vapour to pass through," continues Dr Gaeta. "Air enters the contactor, flows onto the membrane surface and is then de-humidified, at the level required for the specific application."

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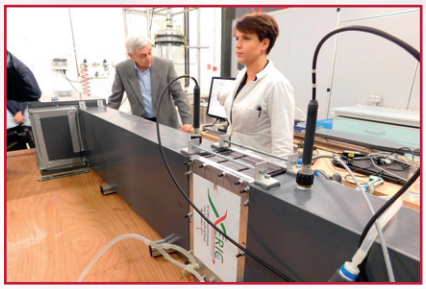
The main application that has been identified is electric cars, yet Dr Gaeta says the system could potentially be applied in other situations where humidity needs to be removed from the air. This could mean hospitals or refrigeration rooms for example, yet attention in the project is currently focused mainly on cars. "This is the most demanding application, because space is limited in cars," points out Dr Gaeta. The next generation of electric cars may have more space, yet Dr Gaeta and his colleagues are still working to miniaturise the Xeric system further, while also looking to test and validate it. "At the moment we are bench-testing the system. It is being tested by Frigomar, one of our partners, who are active in climate control in big boat yards. This is another application which could be explored in future," he outlines. "Space and weight are very important in ships - every square metre and extra kilogramme costs money, so they aim to optimise the room and the weight for any equipment, including climatic control systems."



Above: Testing 3F-CMC's prototype at TICASS.

Exploitation workshop group

XERIC

Innovative Climate-Control System to Extend Range of Electric Vehicles and Improve Comfort

XERIC is a European Research & Innovation project, which gathers 8 partners since June 2015 (duration: 36 months). The project has received funding from the European Union's Horizon 2020 programme under grant agreement n°653605.

Project Coordinator, Soccorso Nino Gaeta
GVS S.P.A. Italy
Via Roma 50
40069 ZOLA PREDOSA (BO)
Italy

T: +39 051 6 176 321
E: sng@gvs.com
W: http://xeric.eu
Tw: @XERICproject

Dr Nino Gaeta is responsible for International Cooperation and Consulting Scientist at GVS in Bologna, Italy. He is Doctor in Chemical Engineering and has held positions at companies in both Italy and America.