



H2planet fuel-cell vehicle experience

Hy-GO

Hydrogen moved projects



Hy-Go

Fuel-cell powertrain

This is one of the most desirable on-board configurations for electric vehicles yet: replacing all of the batteries on vehicles for a battery-free configuration which allows to save weight and cost of replacement of batteries. This is one of the major tasks of H2planet staff that through the use of supercapacitors with proprietary fuel-cell progressive charging systems allows you to make an electric vehicle completely powered by a PEM hydrogen fuel-cell thanks to use of an easy-to-install package.



Hy-Go

Fuel-cell range extender



This configuration combines the latest battery technologies, or even the most traditional, in order to increase the autonomy of the vehicles up to over twice. This represents a convenient alternative to the fully fuel-cell powered configurations addressing power to recharge batteries and extending capacitance. The fuel-cell system guarantees performances that can not be compared with batteries only, allowing charging even in off-grid and stationary vehicle conditions, fully automatically.

Agrirobot "Zaffy" (EU project)

A very special electric vehicle with a delicate mission: collecting the precious flower of saffron. H2planet got the solution for your most ambitious and sophisticated projects.



The use of H2planet fuel-cell systems on-board has doubled the range of electric vehicles



The key issue is firstly to understand that saffron flower is a valuable product...No pollutant emitted by traditional internal combustion engine could be tolerated during collection. The choice of the optimal system configuration is crucial: the identification of the appropriate source of hydrogen on-board and the most appropriate storage technology. In this configuration, the dimensions of the entire fuel-cell system was studied in order to achieve the required autonomy range using a simple system of charging the lead-gel batteries on board. Prior to fuel-cell system installation the range of the vehicle was short and allowed short saffron collection operations, often characterized by the need of returning to charging place to swap batteries inefficiently. The robotic vehicle has been provided with an appropriate storage system: 1000wh of accumulation in hydrogen able to charge batteries with a capacity of 29Ah at 12VDC. This ensured the doubling of vehicle's range, optimizing the harvesting operations, saving time and reducing the risks due to the maneuvering of the vehicle during return, related to the high chance of damaging the precious flowers.



Ease of integration and installation flexibility of H2planet fuel-cell systems, makes solutions completely reliable and user-friendly, also for less experienced users and installers.



Generally the fuel-cell systems installed on-board include an air cooled PEM stack, a system for energy storage in metal hydrides canisters or standard/carbon fiber compressed cylinders, plus electronic control system and ultracapacitors

The integration can be made by using spaces and enclosure boxes already on board, or providing dedicated cabinet or existing plug and play generators supplied by H2planet



Golf car

The fuel-cell innovation applied to sport in the world of golf. Vehicles with no need to recharge for the whole day and charging hydrogen stations powered by the sun for entire week-ends or run.



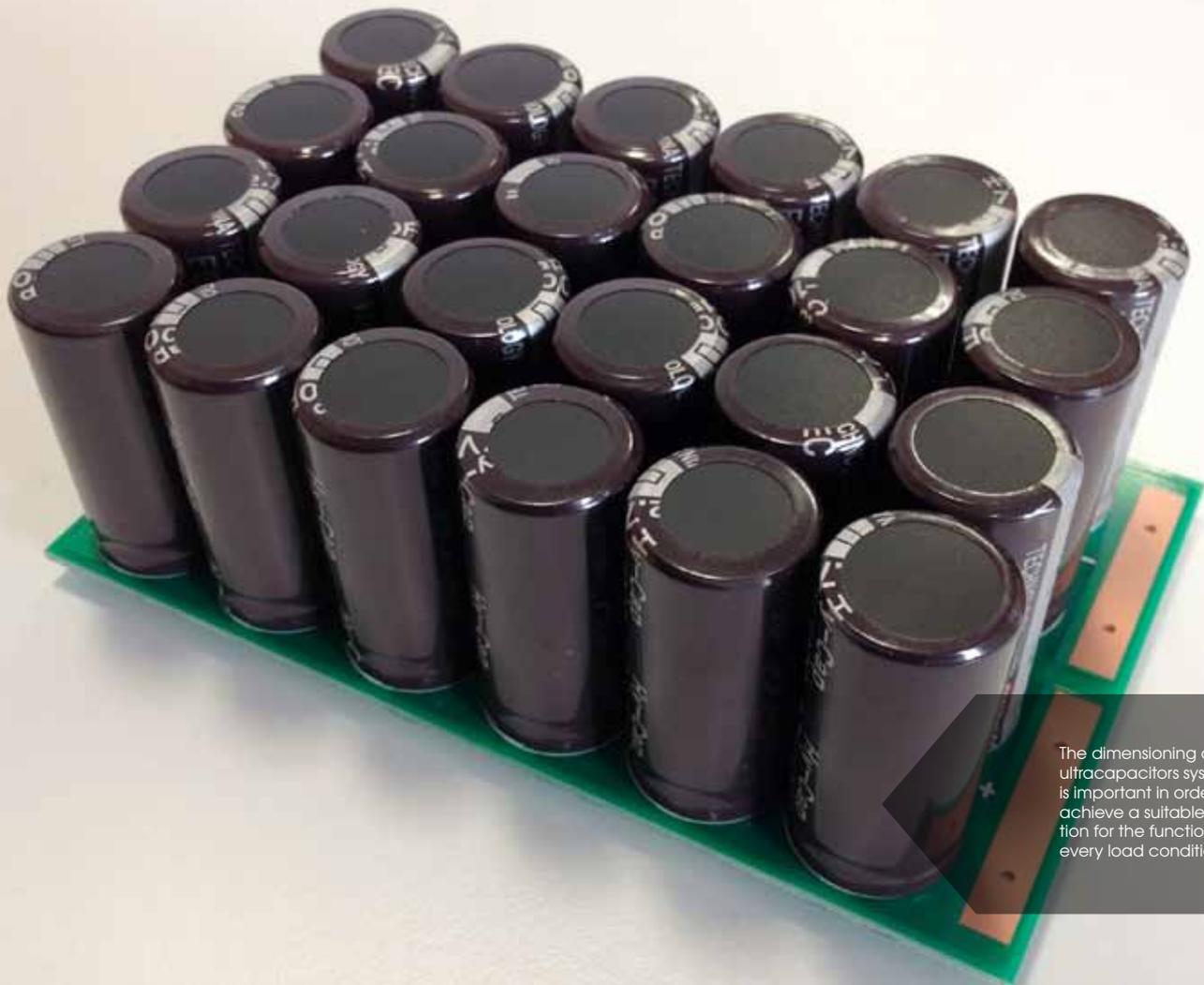
Golf cars are one of the most efficient applications of hydrogen fuel-cell technology.



The on-board fuel-cell system was initially developed following the idea of supporting the recharging of batteries on-board with a peak power of 200W. Later, after testing the efficacy, the power supply was turned into a full fuel-cell powertrain in order to make vehicles completely independent from batteries and characterized by the lightness of the system with 2000W peak power installed. The hydrogen storage system with initially 1000Wh was extended to support high flow rates of hydrogen typical of 2000W stack using storage in aluminum high-pressure cylinders. The battery life up to 8 hours allows to recharge the vehicle in 5 minutes with the H2planet charging stations in a full fuel-cell powertrain configuration. Instead, many solutions of PEM systems in carbon fiber stack are provided depending on the desired speed of recharge. These vehicles are configurable with different storage systems on-board up to several kW and with instant powers up to over 3000W. These are also interesting solutions which are suitable for disabled people. In each cases, the weight saving is very significant and can reach over 50% up to 70% for some types of storage systems in carbon fiber. Golf Era is changing!



Full fuel-cell powertrain and fuel-cell range extender solutions bring the vehicle to cover ranges which are generally not reachable with batteries because of problems of weight and size.



The dimensioning of the ultracapacitors system is important in order to achieve a suitable solution for the functioning in every load condition.

The ease of integration allows to create systems with single or multiple power stack facilitating an easy placement of the fuel-cell system and the H₂ storage using available space on-board.



Special vehicles

H2planet helps the customer from scratch idea to solution providing technologies for the most ambitious projects. Vehicles for filming are one of these special cases.



The mechanical arm allows maximum flexibility during film shooting on the move



Which are the most typical problems for motion pictures during filming of your favorite series and movies? The vibrations of the vehicles, the noise and the impossibility of having visible exhaust emissions. An electric vehicle is the only way to solve these problems. But these are not the only issues on board: the mechanical arms that usually move during shooting and get

up and bend, consume large amounts of energy and with absorption slightly lower than 300W. The study led by H2planet allowed to develop for the customer a fuel-cell range extender customized system in order to buffer the charging of the batteries on board and ensure manoeuvring autonomy of mechanical arm for the shooting with no impact on the range of the vehicle.

The result on the shoot has been immediately concrete ensuring a full day of shooting with no need of batteries replacement and the return of the vehicle at charging station for swapping batteries. Small private charging stations allow rapid charging of H2 metal hydrides cartridges at low pressure after the end of shooting. Hydrogen, fuel-cell, action!



The energy consumption of an average on board filming day heavily compromised the shooting time. The hydrogen fuel-cell system has solved many problems by reducing the economic impact



The fuel-cell system, if properly conditioned thru proper slits and air-intakes can be placed in multiple cabinet solutions ideal for transportation according to the different requirements of size and weight of the customer, especially where portability is crucial

The hydrogen energy storage has to be sized up depending on planned operational hours and on the needed power peak to be supplied with various models of fuel-cell



E-bike (EU project)

The “e-mobility” is going through an era of rapid development and innovation. Fuel cell solutions contribute to finally solve the problem of batteries and their replacement.



H2planet worked as a technical partner for this project of hydrogen bike



H2planet proactively contributed to the realization of fuel-cell powered e-bikes with supply of complete on-board systems. But this is part of a much more ambitious project: totally eliminating batteries powering electric motor on-board thanks to a full fuel-cell power-train solution. The most interesting part of the project was definitively the creation of cus-

tomized metal hydrides system and its power plant. H2planet has customized size and color of the canisters and also the system of ultracapacitors that are able to “react” to request of starting torque of the vehicle. The configuration of vehicle which allows the fitting of the metal hydrides system into the steering column of the bicycle ensures maximum safety with a

great advantage from the aesthetic point of view. This vehicle represent nowadays, the best bike design powered by fuel-cells yet. The best technical features thanks to the combination of fuel-cell technology of the ultimate —generation and the advanced energy storage system at low pressure. The refilling plug system is also available in the “on bike” version.



Zero emissions, pedal assist e-bike, 100% powered by hydrogen fuel-cell. Up to 300W peak power and autonomy up to over 3 hours at maximum power. All this and more thanks to H2planet solutions for e-mobility



All customized according to your needs: the PEM fuel-cell stack, the metal hydrides canister, the electronic control system for ultracapacitors progressive charging plus firmware management of add-on auxiliaries

Even the strictest requirements of space and weight can be met and satisfied. Working together with H2planet technical staff will allow you to become part of a unique mission: forever changing the world of e-mobility with zero emissions





Hydrogen and fuel-cell experience

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