



### **Scaled Electric Solar powered UAV made its first Italian flight** by

**Prof. Giulio Romeo**

A scaled size model of HeliPlat® (High Altitude Very-Long Endurance - Unmanned Aerial Vehicle) has made its first flight powered by solar energy. The flight has been done near Turin (45° North latitude), Italy, within research project funded by the European Commission.

With a wingspan of up to 7m and weight of 22 kg, 2 square meters of thin high efficiency (21%) mono-crystalline silicon arrays have been bonded over the wing skin (Fig. 1); furthermore rechargeable lithium batteries are added to the airplane for take-off and night flight.

The UAV has been equipped with a thermo camera and a video camera (40x) for preliminary test of earth observing (Fig. 2, 3).

The plane represents the first Italian UAV, flying by solar power; it is also the first European UAV flying in Europe (after the few flights made in the '90 by the DLR scaled model "Solitair" – no more active).

The experimental tests carried in this autumnal days validated few critical technologies for high altitude very long endurance flight: high efficiency solar cells, electric brushless motor, controllers, video and thermo camera images transmission, etc.

The research group, coordinated by Prof. Giulio Romeo, is composed by several researchers of Turin Polytechnic University, Dept. of Aerospace Eng.

The full scale HeliPlat® UAV has been designed for obtaining an endurance of several months and being operable in almost all typical environment conditions (wind jet up to 38m/s – 137km/h) at stratospheric altitude. During the day it flies by solar power generated by thin high efficiency solar cells that cover the aircraft's wing and horizontal tail. By night it is powered by a brushless electric motor and fuel cell system fed by gaseous hydrogen and oxygen stored into pressurized tanks. A payload up to 150kg, with available power up to 1500W, could be installed on board for several global monitoring of environmental and security applications (GMES) such as forest fire early detection, border patrol, wide maritime areas illegal immigration monitoring, etc.

[http://www.interdip.polito.it/aeronautica/gruppo\\_romeo/romeoindex.html](http://www.interdip.polito.it/aeronautica/gruppo_romeo/romeoindex.html)

The most critical technology (fuel cell power system for night flight) is under investigation in the research project ENFICA-FC (Environmental Friendly Inter-City Aircraft powered by Fuel Cell) funded by the European Commission (2006-2009). The project, carried out by the several partners of the consortium coordinated by Prof. Giulio ROMEO, is aiming to several experimental tests of the two-seat aircraft Rapid 200 (produced by Jihlavan Airplane) which shall be transformed from a combustion engine power system into a free pollution - low noise electric fuel cell power system.

<http://www.enfica-fc.polito.it/>

Although a lot of work shall be done, and already planned for the next future, a great milestone was reached by our small research group (Prof. G. Frulla, Ingg. F. Borello, E. Cestino, M. Pacino; with the contribution of A. Motto from Archemide Advanced Composite and Gianni Raposio).

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# POLITECNICO DI TORINO



Fig. 1

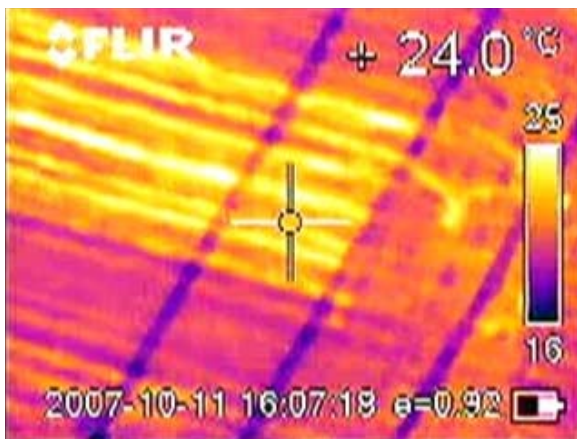


Fig.2



Fig.3

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