Project Sol'R Nephelios, world's first solar powered airship

Peter Lobner, 1 August 2019

Project Sol'R was a collaboration among as many as 50 French student volunteers, some from INSA Lyon, the engineering school that was the cradle of the project, and a team of other students from the IUT Saint-Denis. These students engaged in the development, construction and testing of the world's first solar-powered airship, Nephelios. The project Facebook page is here:

www.projetsolr.com

Concept drawing of the Nephelios airship.
Source: Project Sol'R

Nephelios is a semi-rigid experimental airship with an aluminum frame and a helium gas envelope made from nylon and polyethylene. The gas envelope measures 22 meters (72 feet) long and 5.5 meters (18 feet) in diameter. There appear to be two small ballonets inside the gas envelope.

On the top of the gas envelope, the airship carries an array of semi-flexible solar cells, rated at 2.4 kW, to charge the airship's battery and provide power for propulsion. A small electric motor drives two vectorable propellers, which Project Sol'R claims can deliver a maximum speed of about 40 kph (25 mph).

Flexible solar array on the gas envelope. Source: Project Sol'R

One propeller and drive assembly. The battery is in the orange box. Source: Project Sol'R

Nephelios first flew in 2009 and operated out of the aerodrome of Villaroche (Seine-et-Marne).

Source: Project Sol'R

In 2010, Nephelios was being prepared to become the world's first solar-powered airship to cross the English Channel. However, the attempt never occurred. At the following link, you can view a very short video, "Projet Sol'R Traversée," of an animated depiction of what the planned crossing might have looked like.
https://www.youtube.com/watch?v=xPHlfBI8yvQ

Source: Project Sol'R

On 18 March 2011, the following is an English translation of an assessment of the Nephelios airship that was posted on the project Sol'R Facebook blog:

> "These flight tests have earned us the gratification of the completion of a great collective work, but have also highlighted design flaws detrimental to the smooth running of flights. With its two propellers orientated on the gondola (nacelle), our airship was designed with a propulsion system similar to the airship"Miss Louise,"which balloonist Stéphane Rousson pedaled over the Channel; a design inherited from the brilliant Zeppy Luc Geiser.
>
> Particularly adapted to a good maneuverability at very low speed in exceptional weather conditions and for very slow propellers, this configuration quickly shows its limits when the breeze rises, and imposes heavy loads on the nacelle. In addition, it is not optimal for the safety of the ground crew, which is absolutely necessary during the take-off and landing phases. And, despite these beautiful images the airship has not yet shown the reliability needed for crossing the Channel."

While not making an Channel crossing, Nephelios succeeded in flying on solar power alone, albeit at slow speed and in low wind conditions.

Source: Project Sol'R

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