

# **Electrically and solar-powered aircraft :**

## **Proposal for modification in the FAI Sporting Code**

Submitted by CIACA Amateur-built and Experimental Aircraft Commission)

### **Preliminary remarks**

In the course of the last ten years a noticeable development in the technologies of photo-voltaic conversion and electrical energy storage devices has taken place, such to significantly improve the potential performance of electrically- and solar-powered aircraft. The observation of this trend allows to predict further quick performance improvements which were not even thinkable a few years ago.

A 350 Km straight flight, powered by direct sun-light radiated energy, has already been carried out (over the clouds in still air) by a solar-powered aircraft (aeroplane). The potential performance prediction have even allowed to consider, within a few years, the possibility to perform a flight around the earth and a very qualified team is actively pursuing such a challenging goal.

The urgent need to prepare for new FAI Record recognition rules is then evident.

In the monitoring and promotional role that CIACA, since many years, are playing with respect to these emerging Experimental kinds of flying machines, tight relationships with groups of interests are being developed and the subject has been technically deepened by the specialized Sub-Committee.

In this frame, and in full respect of the FAI responsibility roles, CIACA are herein suggesting CASI to consider their proposal aimed at making the FAI Sporting Code more suitable to cope with the aforementioned incoming requirements.

This proposal consist of two parts:

- 1) A number of comments to the present FAI Sporting code, which according to the CIACA proposal of 1999, included electrically- and Solar-Powered Aircraft
- 2) A Draft of a new FAI Sporting code Section (Named SC 13).

### **1. Comments on Present Sporting Code**

At present the category "Solar-powered Aerodynes" is considered a sub-set of "Electrically-powered Aerodynes", all together being a sub-class of Class C "Aeroplanes",

A first (minor) comment refers to the different wording in three places of the Sporting Code :

- Pag iii  
(TABLE OF CONTENT.....2.2.1.3): Class C, Aeroplanes, Solar-and Electric-powered aerodynes
- Pag 1-2  
FAI Classes Table , bottom line :  
Solar-powered aircraft  
Electrically-powered aircraft
- Pag.2-1 (paragraph 2.2.1.3)  
ELECTRICALLY-POWERED AERODYNE  
SOLAR-POWERED AERODYNE

Evidently these different wording is misleading and should be unified.

It does not make sense to present ELECTRICALLY-POWERED AERODYNE and SOLAR-POWERED AERODYNE as a sub-set of AEROPLANE, being Aeroplanes themselves a sub set of Aerodynes....

However, taking into account that it will not be possible, for technical reasons, to produce NOW a Sporting Code Section capable of coping with all future different kinds of Electrically-powered and Solar-powered AERODYNES, we are herein suggesting to concentrate on Aeroplanes only. In addition to that, Electrically-powered and Solar-powered ones present very different technical and operational peculiarities. Those of the Solar-powered aeroplanes are clear and mature enough to be subject of a comprehensive section of the sporting code, while the other shall still require some time.

THEREFORE :

A modification should be included in the Definition paragraph 2.2.1.3. as follows: (underlined the proposed modified wording)

ELECTRICALLY-POWERED AERODYNE : One which.....→: ELECTRICALLY-POWERED AEROPLANE : One which.....

SOLAR-POWERED AERODYNE : One which can be sustained in level flight in the atmosphere using solar energy impacting on its airframe as its energy source. → SOLAR-POWERED AEROPLANE : One which can be sustained in level flight in the atmosphere using solely sun-light energy impacting on its airframe as its energy source.

(The word “solely” makes the definition clearer and the adoption of the words “sun-light energy” is more appropriate than “energy” alone)

The table No. 1.4 FAI INTERNATIONAL SPORT COMMISSIONS should be changed accordingly, i.e.:

FAI COMMISSION : CIACA  
Sporting Code Section NOT YET ALLOCATED → 13

## 2. Proposals for Record Recognition Rules

When, several years ago, CIACA had proposed the definition of Solar-powered Aircraft, that was inspired by the concept of maximum simplicity, with the intention to introduce more details , if necessary, once the category had been developed to a certain extent.

In accordance with that sound philosophy, therefore, also the initial set of rules for record recognition should be kept as simple as possible. We are, in fact, in a phase where we shall contribute in developing the movement and not in braking it.

What we are here suggesting, in principle, is to consider a Solar-powered aeroplane exactly as stated in its definition : “ one which can be sustained in level flight using solely sun-light energy impacting on its airframe as its energy source”.

Here there is no reference to take-off and climb requirements, neither with respect to “how” the sun-light energy is “USED” . ( In a direct electrical flow to the engine , through partial or temporary storage...).

This allows for the creation of a Solar-powered Aeroplane “Assisted”, those which comply with the aforementioned definition but take advantage, during part of the flight performance (e.g. during take-off) of means of propulsion different from “...sun-light energy impacting on its airframe as its energy source. (see enclosed Sporting code section 13 ”).