

## Autonomous flight working group

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The autonomous flight record category, F8, was approved by the 2006 Plenary meeting to address the major discrepancy between records that could be created by traditional RC aircraft and by models incorporating autonomous control systems. While this has restored the purity of the basic RC records, there is some confusion and overlap between the F8 category and the UAV (Unmanned Aerial Vehicles) category which was recognised by the FAI in 2001. The UAV category is controlled by Sporting Code Section 12 under the auspices of CASI.

The definitions of model aircraft and UAVs in the General Section of the Sporting Code revolve around the UAVs being qualified as "which is designed for scientific research, commercial, governmental or military purposes." This phrase is then repeated in Section 12 (UAVs). In Section 4, this phrase also appears but only to emphasise the *exclusion* of UAVs from the definition of model aircraft which then has the added qualification of "to be used for competition, sport or recreational purposes".

The definitions do not present a clear enough distinction between the categories. The Working Group considers that it is undesirable to allow any UAVs to participate in model aircraft competitions or record attempts or come under the auspices of model flying in general. The problem is how to define this distinction. The only natural distinction identified by this Working Group is the inclusion of autonomous functions, such as the ability to navigate between any specified waypoints. In general this is a common feature of many UAVs and is viewed as undesirable for model flying given that the *raison d'être* of model flying is to represent the skill of the flyer.

Even if the model aircraft definition is modified to exclude autonomous functions, it would not limit aids such as wing-levellers and yaw gyros stabilisers, which augment the stability of the model rather than controlling the flight autonomously.

The only class in CIAM which currently allows something which approaches autonomous flight is the steering of gliders in the free flight class F1E. This does not prevent the use of a definition based on autonomous functions since either F1E can be covered by allowing those devices which are legal within the class specification or the class specification can be refined to exclude autonomous systems. The Free Flight Subcommittee is currently discussing a change of F1E definition from the current text "*The glider can be equipped with a steering device, which cannot be controlled by the competitor during flight.*" to "*The glider can be equipped with a steering device, which may use a direction sensor and measurement of flight time. The steering device must not use any measurement of geographical location and must not be controlled by the competitor during flight.*"

An essential characteristic of radio-controlled model flying is the need to keep the model within sight of the flyer throughout the flight, and which is also highly desirable for safety considerations. This mode of flying models has been likened to operating an aircraft VFR whereas UAVs operate under IFR. Those UAVs which do not include autonomous flight control often feature manual control by the operator using video from the aircraft. From considerations of safety and complexity it is considered undesirable that this should be allowed as a control mode for model aircraft. Consequently a revised model aircraft definition could replace the current UAV distinction by a positive statement on autonomous functions and controlling within visual range of the pilot similar to that already written in records rules 2.2.5 and 2.2.6.

## Records

If the new definition for model aircraft is adopted then the F8 Autonomous Flight record category could not, and should not, be maintained. There are currently two records within the F8 category, for distance and duration on the transatlantic flight by Maynard Hill et al. It is

proposed that these should be recognized by CIAM as special achievements and that CIAM should request that CASI adopts the records in the U-1.a category, which is for UAV records by aircraft with weight less than 5 kg and including remote control at some time during the flight. There are currently no records recognized for U-1.a..

## Conclusions

1. The Working Group recommend that UAVs and autonomous flight have no place in model aircraft flying within CIAM
2. This recommendation requires a revised definition of model aircraft
3. Action must be taken about the existing records in the F8 Autonomous Flight category:
  - a) for CIAM to recognise these flights as special achievements
  - b) to retain the records as historical superceded records
  - c) to endeavour to have the records transferred to the relevant UAV category
4. Consequential changes to the Sporting Code record section.

## Details of Proposed changes

### Definition

The Working Group proposes the following change to the definition in Volume ABR:

#### **1.1. GENERAL DEFINITION OF MODEL AIRCRAFT** (*Provisional wording*)

A model aircraft is an aircraft of limited dimensions, with or without a propulsion device, not able to carry a human being and to be used for competition, sport or recreational purposes.

For the whole of the flight, a radio-controlled model aircraft shall be in the direct control of the pilot, via a transmitter, and in the pilot's sight other than for momentary periods.

For control line model aircraft the pilot must physically hold the control-line handle and control the model aircraft himself.

Free flight model aircraft must be launched by the flyer and must not be controlled during the flight other than to terminate the flight.

A model aircraft shall not be equipped with any device which allows it to be flown automatically to a selected location.

### Sporting Code changes

If the definition presented above is adopted, there a number of consequential changes to the Sporting Code volume ABR:

- a) Delete Records section 2.10 (Special rules for Autonomous Flight Records).
- b) Delete Autonomous flight records 900 to 934 from Table I "Classification of Records".
- c) In Table III Checklist Record Dossier item 8 delete "other than in the F8 category".
- d) Paragraphs 2.11 and 2.12 to be re-numbered.