Report of the CIAM UAV Working Group

Bruno DELOR - Chairman of the CIAM UAVWG

Annex:

1- Terms of Reference of the UAVWG (Version 1.0 - June 2014).

2- Terminology and definitions.

As recommended by the 2014 CIAM Plenary Meeting, a temporary UAV Working Group (UAVWG) has been established by the CIAM bureau.

The scope and the mission of this working group are described in the Terms of Reference document (see annex 1). The appointed members of the CIAM UAVWG as defined in this document have been informed by an email of the CIAM President dated 7th June 2014.

Beginning of July, Graham LYNN, respected aeromodeller from United Kingdom, has been nominated member of the UAVWG regarding his contribution for EASA and EAS[1] on RPAS and aeromodelling.

So, now there has been finally nine appointed members (including the Chairman) in the UAVWG.

According to the Terms of Reference, an interim report has been established for a presentation by the CIAM President at the CASI meeting (16th October 2014 in Thailand) before to be evaluated by CIAM Bureau at the December Bureau Meeting

The following document is the final report as validated by the CIAM Bureau for presentation to the April 2015 CIAM Plenary Meeting. This report is completed, as required in the Terms of Reference document, by a draft rule for events.

1. FAI CLASSIFICATIONS AND TERMINOLOGY

Three classes are defined in the FAI Sporting Code (General Section) regarding aerodynes that does not carry a human being:

- Class F: Model Aircraft (AL7)
- Class S: Space Model
- Class U: Unmanned Aerial Vehicle UAV (AL5)

As mentioned in General Section 2014 Edition Paragraph 1.4, classes F and S are attached to CIAM (Aeromodelling Commission) and class U is attached to CASI (Air Sport General Commission).

Note: Class S is not concerned by UAV considerations and so is not mentioned in that report.

1.1. Definition of the FAI Class F (Model Aircraft)

This class is defined as follows (General Section 2014 Edition Paragraph 2.2.1.6): "*An aircraft of limited dimensions, with or without a power source, not able to carry a human being*".

The definition of a Model Aircraft is detailed in Section 4 "Aeromodelling" Volume ABR Section 4C Part 1 Paragraph 1.1 "General Definition of a Model Aircraft":

a) *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****.*

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

1 **EASA:** European Aviation Safety Agency
EAS : Europe Air Sports

c) *For control line model aircraft, the flier must physically hold the control line handle and control the model aircraft himself.*

d) *Free flight model aircraft must be launched by the flier and must not be controlled remotely during the flight other than to stop the motor and/or to terminate the flight.*

e) *A model aircraft shall not be equipped with any device that allows it to be flown **automatically** to a selected location.*

1.2. Definition of the FAI Class U (UAV)

This class is defined as follows (General Section 2014 Edition Paragraph 2.2.1.17): "*An aerodyne with means of propulsion that does not carry a human, and which is designed **for scientific research, commercial, governmental or military purposes***".

Notes:

- There are mainly two basic types of UAV, those that are always under the direct control of the operator (within or not VLOS) and those that fly autonomously for at least a part of the flight.
- In the present document, the word "professional" will be used for covering globally activities corresponding to the scientific research, commercial, governmental or military purposes. Most of them are commercial ones but some research activities -like forest growth, geological and archeological research- have to be considered as professional even if they are not done on a commercial basis.

1.3. Terminology and definitions

The General Section includes some general definitions which can apply to a model aircraft. Those definitions are in annex 2.

In this annex 2, the terminology used by International civil Aviation Organization (ICAO) and other terms which can be useful for aeromodelling are also defined.

Note: Regarding those definitions, UAV (Unmanned Aerial Vehicle) which corresponds to the term which is used by FAI for Class U, or RPV (Remotely Piloted Vehicle) are acronyms of the official OACI term RPA (Remotely Piloted Aircraft), whereas UAS (Unmanned Aerial System) is an acronym of RPAS (Remotely Piloted Aircraft System).

2. IMPACT OF TECHNOLOGY ON AEROMOELLING ACTIVITIES

The current available technology clearly impacts the aeromodelling activities (competition, sport or recreational purposes).

2.1. Impact on the actual FAI model aircraft classes

The actual International FAI model aircraft classes are defined for competition purposes only.

The use of electronic devices such as gyro sensors, altimeter, telemetry, GPS offers possibilities of increased performances.

Each CIAM Sub-committee has to define for their classes if such devices can be used and the appropriate requirements and limitations. That can be done with the support of the Electronic Devices In Competitions (EDIC) Working Group established in January 2014.

Note: As discussed during the Open Forum at the 2014 CIAM Plenary Meeting Regarding, it is now possible to imagine in a near future a "blackbox" for data collection or a software FAI mode in order to prevent the risk of "cheating" using on competition such electronic devices.

2.2. New possible types of model aircraft and events classes

CIAM must take attention on all recreational activities that are now possible by using the current available technology such as FPV, circuit with GPS guidance, ...

Note: Just as an illustration of the rapid progress of the technology, the US company Eagletree has recently put on the market a new product named Vector which is a complete stabilising and controlling unit which can be used not only for a multi-rotor, but as well on a fixed wing aeroplane.

It is also important for CIAM to show its interest for all available types of model aircraft. For example, CIAM must clearly recognize a multi-rotor as a specific type of model aircraft and encourage organization of appropriate events as already done in some countries such as Australia and France.

For example, the "Fédération Française d'Aéromodélisme" (FFAM) has organized for the first time in 2014 an Open Event for multi-rotors. At that stage and as hoped by the participants, it has to be considered as a recreational event (festival or flight symposium) rather than a real competition with rigid rules.

Australia (and possibly other countries) has also organized equivalent multi-rotors events with a good level of participation.

Those experiences clearly confirm that there is a potential interest for such multi-rotors events. It could also be imagined equivalent events with fix wing aerodynes.

2.3. Draft rule

As requested in the Terms of Reference of the UAVWG, the Working Group has prepared a draft rule to be considered as a base for organisation of recreational or sporting events with model aircrafts equipped with on-board electronic devices or flight system named "drone model aircraft" and which can be rotary or fixed wing.

Two types of event are covered in draft rule document as proposed

- Recreational event based on a list of flight tasks to be done.
- FPV Racing competition.

The objective is mainly to show that CIAM takes attention and interest regarding those new types of aeromodelling practice and to encourage and help organization of such events. At the moment, those events will be mainly organised on a national basis even if it could be imagined an international event if a country is interested to organize it.

Those rules could be soon outdated regarding rapid evolution of the technology. Moreover, it seems that those who actually practice those activities are not looking for real competition.

So, those rules have clearly to be considered as provisional and certainly not as official or "rigid" competition rules.

At this stage, it is not necessary to officially act new FAI classes (even as provisional rules) to cover those activities.

In those conditions, there is no need at the moment to create a new CIAM Sub-committee in order to cover the evolution of these draft rules and the corresponding events. This can be done on behalf of the CIAM Bureau. A new CIAM Sub-committee will be necessary only when specific FAI classes with real international competitions will be imagined.

3. AIRWORTHINESS AND AIRSPACE REGULATIONS

All National Aviation Authorities and International Airworthiness Administrations work on RPAS in order to define adequate regulations both for airworthiness and for airspace considerations.

ICAO on a world level, Federal Aviation Administration (FAA) in USA and European Aviation Safety Agency (EASA) in Europe are working on the subject.

Note: JARUS (Joint Authorities for Rulemaking on Unmanned Systems) which has been created in 2007 is a group of experts from the National Aviation Authorities (NAAs) and regional aviation safety organizations. Its purpose is to recommend a single set of technical, safety and operational requirements for the certification and safe integration of RPAS into airspace and on aerodromes in order to facilitate each national authority to write their own requirements and to avoid duplicate efforts. The countries members of JARUS are: Australia, Austria, Belgium, Brazil, Canada, Czech Republic, Colombia, Denmark, Finland, Germany, Great Britain, Greece, France, Ireland, Israel, Italy, Malta, Netherlands, Norway, Russia, South Africa, Spain, Switzerland, United States of America.

So, it is obvious that new regulations relative to RPAS will be published in the near future.

There is a risk that those regulations which will mainly be defined for professional activities be also applicable to aeromodelling (competition, sport and recreational purposes).

Thus, once more, it is important to clearly differentiate a model aircraft from a RPA/RPAS (UAV). It is important to consider that a model aircraft used for a recreational or sportive purpose is no more a model aircraft as soon as it is used for a professional purpose.

It is necessary to be proactive on the subject in order to avoid regulations which will not be adapted for aeromodelling activities.

The European Commission is working from 2012 towards a "strategy for the development of civil applications of RPAS" with the objective of a RPAS Road Map covering especially the question of insertion of RPAS in non-segregated airspace. EASA is in charge of the question and a Notice of Proposed Amendment (NPA 2014-09) is actually in discussion in order to propose the alignment of the European common rules of the air (SERA) with amendment 43 to Annex 2 to Chicago Convention in relation to RPAS. In other words, the proposed rules are:

- Rules of the air applicable to RPAS of any mass when flown under general Air Traffic (GAT) rules;
- Nothing related to airworthiness, licensing of remote pilots and operations of RPAS with a mass below 150 kg.

A practical example which shows the necessity to be vigilant in order that regulations defined for RPAS (UAV) have finally not a negative impact on aeromodelling.

EAS, which is the organization representing sport and recreational aviation at the European level, does its best to be involved and take the opportunity to express its position.

In a paper dated January 2013 and signed by David Roberts (EAS President), EAS defines the position of sports and recreational aviation regarding the European Strategy for RPAS. Concerning aeromodelling. In that paper, EAS stresses the main differences between a model aircraft and a RPAS and insists on the fact that any regulation applicable to RPAS must, by definition, not apply to model aircrafts. EAS also offered its technical assistance in order to guide the European Commission and EASA towards the deployment of RPAS in a non-conflicting way with sports and recreational activities.

EAS is officially recognized by FAI. CIAM must continue to be in contact and discuss with EAS with the objective to have common positions regarding model aircraft versus RPAS (UAV).

A questionnaire had been sent to all NAC's by Gerhard Wöbbeking on November 2013 regarding advanced flying systems (FPV, Auto Systems and sUAS). The compiled results of this questionnaire which have been sent to the CIAM Delegates by a mail dated 4 April 2014 provide useful datas.

CIAM should continue to follow the airworthiness and airspace regulations defined by the main National Aviation Authorities which can have an impact on aeromodelling activities, especially regulations on RPAS.

CIAM could also have interest to summarize some basic principles in order to help the NAC's for discussion with their National Aviation Authority and so contribute to the trend towards continuing harmonized rules for model aircraft. This activity should be undertaken in liaison with Europe Air Sports (EAS).

This process may protect the aeromodelling activity from being regulated, at some future date, by rules defined for RPAS.

4. PROPOSALS REGARDING AEROMODELLING ACTIVITIES AND MODEL AIRCRAFT

Proposal 1

Consider as aeromodelling activities all sportive and recreational activities done with aircrafts of limited dimensions not able to carry a human being.

Justification:

The improvement of the technology with miniaturization of sensors and systems may be beneficial for model aircrafts and the current development of UAS may have a positive impact on the aeromodelling activities and contribute to its development.

So, new activities are now possible with a model aircraft by using Advanced Flight Systems (flight stabilisation, automatic flight control,...). As an illustration, FPV activities are more and more developed in some counties regarding the actual miniaturization and performances of the on

board video cameras with possibility of a transmission to a pilot headset or to a computer and screen on ground.

Some new types of model aircraft such as multi-rotors are now available which also offer the possibility of different types of aeromodelling practice.

CIAM must cover all sportive and recreational activities which are now possible to imagine with the new types of model aircraft and/or by using the possibilities of the current technology. If CIAM fails to do this, there will be a clear risk that some other organizations appear to cover those activities as it has been the case for radio-controlled jets with the International Jet Model Committee (IJMC) and organization of the Jet World Masters.

Proposal 2

Only use the terms UAV (and UAS or UA), RPA/RPAS for professional activities (scientific research, commercial, governmental or military purposes).

Justification:

Class F (Model Aircraft) and Class U (UAV) are clearly differentiated. Both concern aircraft that do not carry a human being but the use of such aircrafts in class F are limited to competition, sport or recreational activities while they are used in class U for professional activities.

In those conditions, it is important to forget the terms UAS/UAV (or "Small UAV") or RPAS/RPA for competition, sport or recreational purposes which are relevant of aeromodelling activities. For those activities, it is recommended to consider only the term model aircraft.

As a consequence, class U does not have to be covered by CIAM.

Note: Class U does not concern any sport purpose; so, it will not be logical to consider that this class have to be covered by a FAI Air Sport Commission, even CIACA or CASI. The only interest to maintain such a specific class in the classification for sporting events and records is regarding records done in a professional environment.

Proposal 3

Modify as follows Paragraph 1.1 "General Definition of a Model Aircraft" of Volume ABR Section 4C Part 1 *(deletions as* ~~strike-through~~ *and additions as* **bold underlined**):

a) 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

b) For the whole flight, a radio-controlled model aircraft~~ shall be in the direct control of the flier, via a transmitter, and in the flier's sight other than for momentary periods~~ **must be within visual line of sight (VLOS) of the flier who assumes directly its control or who is in a situation to take the direct control at any moment, including if the model is being flown automatically to a selected location**.

c) For control line model aircraft, the flier must physically hold the control line handle and control the model aircraft himself.

d) Free flight model aircraft must be launched by the flier**,** and must not be **equipped with any device that allows it to be flown automatically to a selected location or** controlled remotely during the flight other than to stop the motor and/or to terminate the flight

~~e) A model aircraft shall not be equipped with any device that allows it to be flown automatically to a selected location.~~

~~f)~~**e)** In the case of record attempts conducted under Part 2, the claimant(s) shall confirm that the submitted record claim is for a model aircraft record as noted in Table III.

Justification:

It is not necessary to modify the general definition of a model aircraft in General Section of the FAI Sporting Code.

But the detailed definition of a model aircraft in Volume ABR have to be adapted.

So, it is recommended to reconsider the sub-paragraph b) in order, under some conditions, to permit flights such as FPV which are not realised in direct VLOS of the flyer who controls its model aircraft via the visual pictures he got from his headset or on a screen on ground.

But, in that situation, it is necessary to accept to assume a separate VLOS of the model aircraft in order to prevent any collision with another aircraft. It can be done by an operator (other than the flyer) in charge of the safety and who has to be permanently in situation, in case of a problem, to take the control of the model aircraft using or not a dual radio-control transmitter.

It is also recommended to delete the subparagraph e) in order to accept devices, equipments or systems that permit automatic flight for a model aircraft (within respect of the VLOS requirement).

With such modification of the detailed definition of a model aircraft, all types of aircrafts which are not able to carry a human being and which are used within VLOS of the flier for competition, sport or recreational purposes can be considered as a model aircraft. That covers the case of a model aircraft which is directly radio-controlled by the flier with a transmitter but also the case of a model aircraft which is computer controlled for an automatic flight.

Note: In the January 2013 paper signed by the EAS President, David Robert, the following fundamental characteristics of an aeromodel (model aircraft) are suggested to the European Commission:

- It is operated for sport and recreational purposes and in non-commercial environment.
- It is operated within visual line of sight (VLOS) of the operator;
- The primary purpose of a flight is to fly the aeromodel to increase personal skills, whereas with an RPAS the primary purpose of the flight is the achievement of the task (aerial work) with the control of a flight being a secondary or automated function.

Those characteristics are compliant with the modified FAI detailed definition of a model aircraft which is suggested.

Proposal 4

Formalize a typology of the different types of model aircraft and take it in account for the naming of the actual FAI model aircraft classes.

Justification:

It seems appropriate do define the different types of model aircraft according to the FAI terminology as defined in General Section (see annex 2).

So, on reference of the general definitions of General Section, it could be suggested to retain the following terminology as applicable for model aircraft: aeroplane, glider, motor glider, helicopter (as a type of rotorcraft), aerostat.

It is also appropriate to retain some other specific types such as multi-rotor (or multi-copter), drone model aircraft, self guided drone (see definitions in annex 2 paragraph C).

Notes:

- As mentioned before in the report, it is necessary to assume a permanent VLOS of the model aircraft in order to prevent any collision with another aircraft. It can be done if necessary by an operator (other than the operator in charge of the flight) in charge of the safety.
- The term "drone" (acronym of RPA with a military origin) is now a very common name used both to characterize small UAV's for civil professional applications and as toy or model aircraft for recreational use. So, that term can be confusing and so justify a clear definition when used as a model aircraft for a recreational or competition purpose.

It is also suggested to clarify the naming of the actual FAI model aircraft classes. At the moment, "model aircraft" is mentioned for some classes, in the name of the class. For some other classes, the term "helicopter" or "glider" is used in preference to "model aircraft"; for RC racer classes, the combination "pylon racing model aircraft" is used.

All categories and classes for class F are relative to model aircraft. So, rather to mention "model aircraft", it is more useful to mention in the name of a class the type of model aircraft corresponding to that class: "aeroplane", "helicopter", "racer", "glider", "motor glider", "aerostat", ...

5. CONCLUSION

The expansion of the professional activities of aircrafts not able to carry a human being (RPA/RPAS, UAV/UAS) represents at the same time an opportunity and a risk for aeromodelling.

An opportunity because miniaturization of sensors and systems can be profitable for the sportive and recreational activities and so can contribute to a development of aeromodelling. Moreover, specific skills and competences of some aeromodellers can interest the professionals and so give an opportunity for associations or persons to take part to professional activities being remunerated or not.

A risk because airworthiness and airspace regulations which will be defined for RPAS UAV's may have a negative impact on model aircraft activities. So, in order to minimize that risk, it is strongly recommended to consider that model aircraft activities could only be done within visual line of sight (VLOS) of the model aircraft and so stays on that point as it is now.

It is recommended to consider as a model aircraft any type of small aircraft which does not carry a human being as soon as it is used for competition, sport or recreational purposes with respect of the VLOS requirement.

CIAM must take care about all types of those aircrafts, such as for example multi-rotor or self guided model aircraft ("recreational drone"), and must cover all sportive and recreational activities which are now possible to imagine with such types of model aircraft and/or by using the new possibilities offered by the current technology.

As requested in the Terms of Reference of the UAVWG, the Working Group has completed its report by a draft rule to be considered as a base for organisation of recreational or sporting events with drone model aircrafts (rotary or fixed wing). At this stage, it is not necessary to act new FAI classes (even as provisional rules) and to create a new CIAM Sub-committee in order to cover the corresponding events. This can be done on behalf of the CIAM Bureau and a new CIAM Sub-committee will be necessary only when specific FAI classes with real international competitions will be imagined.

Regarding airworthiness and airspace regulations, it is necessary to be careful in order to avoid regulations which will not be adapted for aeromodelling activities.

- ANNEX 1 -

TERMS OF REFERENCE OF THE UAVWG

(Version 1.0 - June 2014)

Background

During CASI Plenary Meeting in Kuala Lumpur (October 2013), CIAM President mentioned that CIAM will examine the possibility to include UAV and similar technology activities within the scope of CIAM activities.

On a proposal of the CIAM Bureau Meeting, CIAM Plenary Meeting in April 2014 decided to establish a Working Group in order to prepare a report to be evaluated during the December 2014 CIAM Bureau Meeting. Depending on the report, CIAM will consider the interest of a separate Sub-Committee to take care of this activity. This will be decided by the CIAM Plenary Meeting in 2015.

Mission

The mission of this CIAM Working Group is:

- To evaluate the impact for CIAM activities of the current available technology especially regarding the sporting activity and events.
- To prepare a draft rule to be considered as a base for future sporting events and consider whether a test event can be organized.
- To define the interest of a new separate Sub-Committee and the qualifications required for the members of such a Sub-Committee.
- If so tasked by CIAM Bureau, to prepare the necessary rules modifications in order to establish a new Sub-Committee.

The CIAM Working Group will prepare an interim report to be presented at the next CASI meeting (October 2014) and a report to be evaluated by CIAM Bureau at the December Bureau Meeting.

Membership

The working group will comprise the following 8 (eight) appointed members:

- Chairman: Bruno DELOR – France (CIAM 1st VP and CIAM Delegate)
- Members:
  - Narve JENSEN - Norway (CIAM 2nd VP and CIAM delegate)
  - Robert HERZOG - Belgium (CIAM Delegate)
  - Ivan HOREJSI - Czech Republic
  - John LANGFORD - USA (CIAM Space Models expert and CEO of AURORA Technologies)
  - Bengt LINDGREN - Sweden (CIAM Delegate and CASI member)
  - Jure PECAR - Slovenia
  - David TRAINO - Australia

Transaction of business

- The normal business of the Working Group is expected to be conducted through the mediums of email and VoIP (Voice over IP) services.
- The Working Group may plan face-to-face meetings in conjunction with other CIAM activities meetings at which all, or the majority of, Working Group members are present.
- Working Group members are not entitled to claim any casual expenses or travel costs from the CIAM unless these are expressly pre-approved by CIAM Bureau.

Term

- The Working Group shall be appointed for a term from June 2014 to April 2015.

- ANNEX 2 -

TERMINOLOGY DEFINITIONS

A) FAI GENERAL DEFINITIONS

a) General Section Paragraph 2.2.1

- **Aircraft:** vehicle that can be sustained in the atmosphere by forces exerted on it by the air. There are two types of aircraft: aerodyne and aerostat.
- **Aerodyne:** heavier-than-air aircraft which derives its lift in flight mainly from aerodynamic forces.
- **Aerostat:** aircraft lighter than air.

b) General Section Paragraph 2.2.1.3 (definitions regarding class C)

- **Aeroplane:** fixed wing aerodyne with means of propulsion.
- **Electrically-powered aeroplane:** aeroplane which can be sustained in level flight in the atmosphere using solely an electrical motor(s).
- **Solar-powered aeroplane:** aeroplane which can be sustained in level flight in the atmosphere using solar energy impacting on its airframe as its energy source.

  Note: Solar-powered aeroplane model aircraft (or UAV) but it can be imagined in a next future regarding the progress done on the solar panels technology.

c) General Section Paragraph 2.2.1.4 (definitions regarding class D)

- **Glider:** fixed wing aerodyne capable of sustained soaring flight and having no means of propulsion.
- **Motor glider:** fixed wing aerodyne equipped with means of propulsion, capable of sustained soaring flight without thrust from the means of propulsion

d) General Section Paragraph 2.2.1.5 (definitions regarding class E)

- **Rotorcraft:** aerodyne that derives the whole or a substantial part of its lift from a rotary wing system.
- **Helicopter:** rotorcraft with a power driven rotor system whose axis (axes) is (are) fixed and substantially perpendicular to the longitudinal axis of the rotorcraft.

Note: this class covers two other types of rotorcraft (autogyro and tilt rotorcraft).

B) ICAO TERMINOLOGY

Remotely Piloted Aircraft (RPA)**:** unmanned aircraft which is piloted from a remote pilot station.

Remotely Piloted Aircraft System (RPAS)**:** remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design.

Remote pilot station: component of the remotely piloted aircraft system containing the equipment used to pilot the remotely piloted aircraft.

RPA observer: trained and competent person designated by the operator who, by visual observation of the remotely piloted aircraft, assists the remote pilot in the safe conduct of the flight.

Remote pilot: person charged by the operator with duties essential to the operation of a remotely piloted aircraft and who manipulates the flight controls, as appropriate, during flight time.

Operator: person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Note: In the context of a remotely piloted aircraft, an aircraft operation includes the remotely piloted aircraft system.

Visual line of sight (VLOS) **operation:** operation in which the remote pilot or RPA observer maintains direct unaided visual contact with the remotely piloted aircraft.

C) OTHER DEFINITIONS USEFUL FOR AEROMODELLING

Fixed wing model aircraft: model aircraft with mean(s) of propulsion which derives its major lift from fixed wing(s) surface(s).

Rotary wing model aircraft: model aircraft with mean(s) of propulsion which derives the whole or a substantial part of its lift from a rotary wing system.

Multi-rotor (or multi-copter): rotary wing model aircraft with more than two rotors.

Drone model aircraft: model aircraft equipped with on-board electronic devices (gyro sensors, altimeter, telemetry, GPS, video camera, ...) or associated flight systems (flight stabilisation, automatic flight control,...).

Note: *a drone model aircraft such as defined in the present document must have a mean of propulsion and can be in a fixed-wing configuration (aeroplane) or in a rotorcraft one.*

Self-guided drone: drone equipped with a programmable autopilot system which can automatically stabilize the drone and/or initiate a programmed flight path. Such a drone is mission orientated and computer controlled nearly its entire flight, but it must be possible for the flight operator to desactivate at any moment the autopilot system.

First Person View (FPV)**:** video view of the model aircraft's camera transmitted to a headset goggle of the pilot or to a screen.