



FAI Sporting Code

*Fédération
Aéronautique
Internationale*

Section 4 - Aeromodelling

Volume F3 Radio Control Drone Racing

2017 Edition

Effective 15 March 2017

F3U (Provisional class) – RC MULTI-ROTOR FPV RACING

ANNEX - FPV RACING WORLD CUP RULES

*Maison du Sport International
Avenue de Rhodanie 54
CH-1007 Lausanne
Switzerland
Tel: +41(0)21/345.10.70
Fax: +41(0)21/345.10.77
Email: sec@fai.org
Web: www.fai.org*

FEDERATION AERONAUTIQUE INTERNATIONALE

Maison du Sport International, Avenue de Rhodanie 54, 1007 LAUSANNE, Switzerland

Copyright 2017

All rights reserved. Copyright in this document is owned by the Fédération Aéronautique Internationale (FAI). Any person acting on behalf of the FAI or one of its Members is hereby authorised to copy, print, and distribute this document, subject to the following conditions:

- 1. The document may be used for information only and may not be exploited for commercial purposes.**
- 2. Any copy of this document or portion thereof must include this copyright notice.**
- 3. Regulations applicable to air law, air traffic and control in the respective countries are reserved in any event. They must be observed and, where applicable, take precedence over any sport regulations**

Note that any product, process or technology described in the document may be the subject of other Intellectual Property rights reserved by the Fédération Aéronautique Internationale or other entities and is not licensed hereunder.

RIGHTS TO FAI INTERNATIONAL SPORTING EVENTS

All international sporting events organised wholly or partly under the rules of the Fédération Aéronautique Internationale (FAI) Sporting Code¹ are termed *FAI International Sporting Events*². Under the FAI Statutes³, FAI owns and controls all rights relating to FAI International Sporting Events. FAI Members⁴ shall, within their national territories⁵, enforce FAI ownership of FAI International Sporting Events and require them to be registered in the FAI Sporting Calendar⁶.

An event organiser who wishes to exploit rights to any commercial activity at such events shall seek prior agreement with FAI. The rights owned by FAI which may, by agreement, be transferred to event organisers include, but are not limited to advertising at or for FAI events, use of the event name or logo for merchandising purposes and use of any sound, image, program and/or data, whether recorded electronically or otherwise or transmitted in real time. This includes specifically all rights to the use of any material, electronic or other, including software that forms part of any method or system for judging, scoring, performance evaluation or information utilised in any FAI International Sporting Event⁷.

Each FAI Air Sport Commission⁸ may negotiate agreements, with FAI Members or other entities authorised by the appropriate FAI Member, for the transfer of all or parts of the rights to any FAI International Sporting Event (except World Air Games events⁹) in the discipline¹⁰, for which it is responsible¹¹ or waive the rights. Any such agreement or waiver, after approval by the appropriate Air Sport Commission President, shall be signed by FAI Officers¹².

Any person or legal entity that accepts responsibility for organising an FAI Sporting Event, whether or not by written agreement, in doing so also accepts the proprietary rights of FAI as stated above. Where no transfer of rights has been agreed in writing, FAI shall retain all rights to the event. Regardless of any agreement or transfer of rights, FAI shall have, free of charge for its own archival and/or promotional use, full access to any sound and/or visual images of any FAI Sporting Event. The FAI also reserves the right to arrange at its own expense for any and all parts of any event to be recorded.

-
- 1 FAI Statutes, Chapter 1, para. 1.6
 - 2 FAI Sporting Code, Gen. Section, Chapter 4, para 4.1.2
 - 3 FAI Statutes, Chapter 1, para 1.8.1
 - 4 FAI Statutes, Chapter 2, para 2.1.1; 2.4.2; 2.5.2 and 2.7.2
 - 5 FAI By-Laws, Chapter 1, para 1.2.1
 - 6 FAI Statutes, Chapter 2, para 2.4.2.2.5
 - 7 FAI By-Laws, Chapter 1, paras 1.2.2 to 1.2.5
 - 8 FAI Statutes, Chapter 5, paras 5.1.1, 5.2, 5.2.3 and 5.2.3.3
 - 9 FAI Sporting Code, Gen. Section, Chapter 4, para 4.1.5
 - 10 FAI Sporting Code, Gen. Section, Chapter 2, para 2.2.
 - 11 FAI Statutes, Chapter 5, para 5.2.3.3.7
 - 12 FAI Statutes, Chapter 6, para 6.1.2.1.3

PAGE DELIBERATELY LEFT BLANK

VOLUME F3 FPV RACING
SECTION 4C - MODEL AIRCRAFT - F3 FPV RACING

F3U (Provisional class) - RC Multi-rotor FPV Racing rules

Annex - FPV Racing World Cup rules

PAGE DELIBERATELY LEFT BLANK

THIS 2017 EDITION INCLUDES THE FOLLOWING AMENDMENTS MADE TO 2016 CODE

These amendments are marked by a double line in the right margin of this edition

Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by
Volume title	Changes introduced 15 March 2017	Change of the name of the Volume: Radio Control Drone Racing instead of Radio Control FPV Racing Model Aircraft.	Bruno Delor S/C Chairman
Page 7		For the rule freeze, deletion of the reference to the CIAM Organizing Committee for FAI International Events for Drones (IED).	
1		Change of the title of the paragraph. Introduction of the possibility for an organiser to require a LED light unit for better differentiation of the models in a race both for judges and for the public.	
1.2		Rewording of the fixed motor tilt rule.	
1.6		Clarification of the wording of the last sentence.	
2.1		Recommended developed size of racing circuit (instead of mandatory).	
2.4		Replacement dimensions 20 m and 10 m by respectively 10 m and 5 m on the drawing relative to a perfect trajectory.	
2.6		Clarification of the start positioning (start line or grid pattern).	
2.7		Choice given to the organiser to keep the circuit secret or to make it public before the contest.	
4		New positioning of the paragraph 4.7 (Model registration and processing) with no rule change. Consequential renumbering of the following paragraphs.	
5.1		New positioning of the paragraph 4;8 (Practice flights) with no rule change.	
5.2		New paragraph to detail the race start procedure.	
5.3		New paragraph to detail timekeeping (manual and automatic).	
5.4		Following changes for the qualification stage (ex paragraph 4.1): - 3 qualifying rounds minimum (instead of 2) in order to give to competitors more chance to get a time. - Deletion of the note mentioning that time penalties is not appropriate in option 2. - Introduction of a new option (option 3).	
5.5		Following changes for the elimination stage (ex paragraph 4.2): - Deletion of the note mentioning that time penalties is not appropriate in option 2. - Introduction of the option 3. - Adaptation of the composition of the groups for the first round (concerns options 1 and 2 only) plus other minor clarifications. The change of the order takes better in consideration placing after the qualifying stage; as an example, with the new table, the two best top pilots can only fly together in the final.	
5.6		Clarification of the final stage regarding introduction of the option, 3.	
6		New paragraph to cover all cases of flight occurrences.	
6		New paragraph to cover all cases of flight occurrences.	
6.2		Identification in a unique paragraph of which is relative to disqualification of the race.	
6.3		Dedicated paragraph to mention how to proceed in case of crash of a model.	
6.5		Clarification of the paragraph (ex 4.6) relative to reflight.	
8.1		Introduction of the possibility of one timekeeper per competitor in addition to the judge. Two timekeepers per competitor in flight is necessary to minimize the risk of a timekeeping problem when timekeeping is not done by an automatic electronic device.	
8.2		Reference to Volume ABR changed to the corresponding reference to CIAM General Rules Volume.	

Paragraph	Plenary meeting approving change	Brief description of change	Change incorporated by
Annex	Changes introduced 15 March 2017	World Cup Rules	Bruno Delor S/C Chairman
World Cup name		Change of the name of the World cup: Drone Racing instead of FPV Racing.	
3		Clarification regarding the fact that CIAM Organising Committee for FAI IED does not exist more after FPV Racing S/C has been created.	
4		Alignment with the other World Cup with a minimum of 2 countries (instead of 3) for allocation of points in a World Cup contest.	
7 and 8		Coordination of the World cup normally done by the FPV Racing and similar activities S/C Chairman with possibility of nomination of a dedicated World Cup coordinator.	
10.	Change introduced 1st January 2017	Appropriate form of CIAM General Rules C.7.4 used for definition of World Cup Board.	Kevin Dodd Technical Secretary

RULE FREEZE FOR THIS VOLUME

Regarding the provisional statute of the F3U class, the content of this Volume is not subject to Plenary Meeting approval, nor is it restricted by any rule freeze regulation.

It is under the direct control of CIAM Bureau and may be updated at any time during the year. ||

CONTENTS

1. MODEL GENERAL SPECIFICATIONS	11
1.1. Weight and size.....	11
1.2. Motorization.....	11
1.3. Propellers.....	11
1.4. Other equipment.....	12
1.5. Identification marks.....	12
1.6. Frequencies	12
2. RACING CIRCUIT.....	12
2.1. Racing circuit size.....	12
2.2. Safety.....	12
2.3. Racing circuit design.....	12
2.4. Air gates.....	12
2.5. Obstacles	15
2.6. Start line - Grid pattern	15
2.7. Other points.....	15
3. NUMBER OF MODELS	16
4. MODEL REGISTRATION AND PROCESSING	16
5. CONTEST ORGANISATION.....	16
5.1. Practice flights.....	17
5.2. Procedure for the start of the race.....	17
5.3. Timekeeping.....	17
5.4. Qualification stage.....	18
5.5. Elimination stage	19
5.6. Final stage.....	21
6. FLIGHT OCCURRENCES.....	21
6.1. Faults and penalties	21
6.2. Disqualification from the race.....	22
6.3. Crash	22
6.4. Video issues.....	22
6.5. Reflight.....	23
7. HELPER.....	23
8. OFFICIALS	23
8.1. Officials needed to run the contest.....	23
8.2. FAI Jury.....	23
8.3. Judges	23
9. INTERRUPTION OF THE CONTEST	24
10. COMPETITORS' INFORMATION	24
ANNEX - DRONE RACING WORLD CUP RULES.....	24

The use of “shall” and “must” implies that the aspect concerned is mandatory. The use of “should” implies a non-mandatory recommendation; “may” indicates what is permitted, and “will” indicates what is going to happen. Words of masculine gender shall be taken as including the feminine gender unless the context indicates otherwise. Words expressing the singular will be taken to include the plural and vice versa. Italics are used for explanatory notes.

PAGE DELIBERATELY LEFT BLANK

F3U (PROVISIONAL CLASS) - RC MULTI-ROTOR FPV RACING

Multi-rotor FPV (First Person View) Racing consists of several multi-rotor model aircraft flying together through a closed racing circuit.

The generic term 'model' will be used in the present document.

Each model is operated by an FPV pilot who is considered as the competitor. The FPV pilot is assisted by a helper.

The FPV pilot is equipped with a headset goggle (or with a screen) which allows him to pilot his model from the video picture of the onboard camera which is transmitted in real time on headset goggle (or on his screen).

1. MODEL GENERAL SPECIFICATIONS

Only multi-rotors corresponding to the following specifications are allowed.

Note: A multi-rotor is a rotary wing radio-controlled model aircraft equipped with at least three power driven propeller devices.

A 1 % tolerance is applicable for inaccuracy of the measurement devices for size, weight and batteries tension.

Any automatic system to level back the model after a crash is forbidden.

In order to provide for the public the best view of the models during the races and to facilitate the task of the judges, each model must be clearly recognisable with, for example, a brightly coloured part of the frame or a custom canopy.

The organiser may also require the competitors to add on their model a LED light unit.

Note: The LED light unit may include the possibility of a programmable colour so that the models may have different colours in any race..

1.1. Weight and size

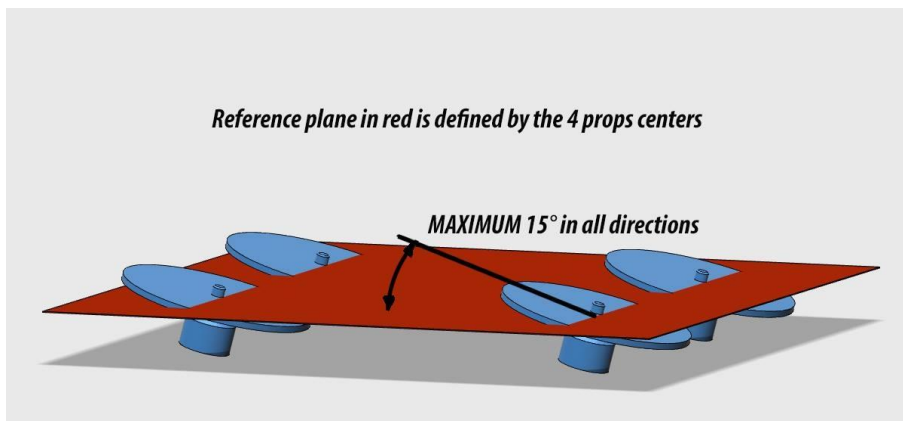
The total weight of the model including all equipment necessary for flight (including batteries) shall not exceed 1 kg.

Distance between axes of the engines shall be less than 330 mm. This distance is measured on the diagonal of the engines' axes.

1.2. Motorization

Only electric motors with a maximum voltage of 17.0 volts (4S) are allowed. The voltage measurement is done before the flight.

The reference plane is defined with propellers centers. Each motor can be tilted up to 15° maximum angle in each direction.



On a tri-copter, the inclination of an engine in flight is only allowed with the yaw order.

1.3. Propellers

Maximum diameter: 6 inches (15.2 cm).

Full metal propellers are forbidden.

Any propeller protection device is forbidden.

1.4. Other equipment

The model must be equipped with a fail-safe device, the triggering of which stops the motorization.

It is forbidden to use a pre-programmed manoeuvring device. Any system for automatic positioning and/or path rectification in longitude, latitude or height is forbidden.

1.5. Identification marks

Each model shall carry the national identification mark followed by the FAI Sporting Licence ID number (or the National FAI licence). The letters and numbers must be at least 10 mm high and appear at least once on each model.

1.6. Frequencies

Frequencies used can only be those authorised in the country in which the contest is organised. Ensuing associated emission power limitations should be respected.

This concerns the radio control system of the model as well as the video transmission device of the onboard camera.

Concerning the radio control system, 2.4 GHz spread spectrum technology systems can only be used.

Any competitor using a forbidden frequency may be disqualified from the contest by the contest director. ||

2. RACING CIRCUIT**2.1. Racing circuit size**

The minimum recommended developed size of racing circuit is: ||

- 250 m for an outdoor field.
- 80 m for an indoor circuit or in woods (named 'short circuit').

The racing circuit for an outdoor field shall be within a 180 m x 100 m rectangle. ||

Note: those dimensions allow to practice on a football field.

If the racing circuit includes passages with a risk of problems from propagation of high frequency waves (such as trees or walls), the organiser will ensure that the video link has sufficient quality for safe piloting with a standard transmitter.

2.2. Safety

A safety line for demarcation of the flight area must be delineated.

The presence of any person in the flight area during a race is strictly forbidden.

The organiser must take care that media coverage of the contest can be done while guaranteeing the safety of the concerned persons.

2.3. Racing circuit design

The organiser is encouraged to demonstrate creativity. He may take advantage of the specifics of his site. He must however respect the following rules.

The racing circuit must be designed in order to prevent accidental diversions from the racing area. In this context, any trajectory to get back to the safety line will be done in the direction of a safe area without any person (public, pilots, helpers, judges). Furthermore, a 10 metre distance will be kept between any air gate or obstacle (air flag, ...) and the safety line.

It is strongly recommended that the track of the circuit is clearly marked on the ground. Each obstacle will be marked as necessary.

In addition, each turn will be marked with a clearly visible flag with a recommended minimum height of 2.5 m for an outdoor field and 1.5 m for a short circuit, in order that the pilot can properly see the turn on his video picture.

2.4. Air gates

The racing circuit must include between 3 and 5 air gates.

The crossing dimensions of the air gates must be adapted to the configuration of the circuit depending especially on the natural obstacles or on the height of the cellar for an indoor circuit.

Recommended crossing dimensions are:

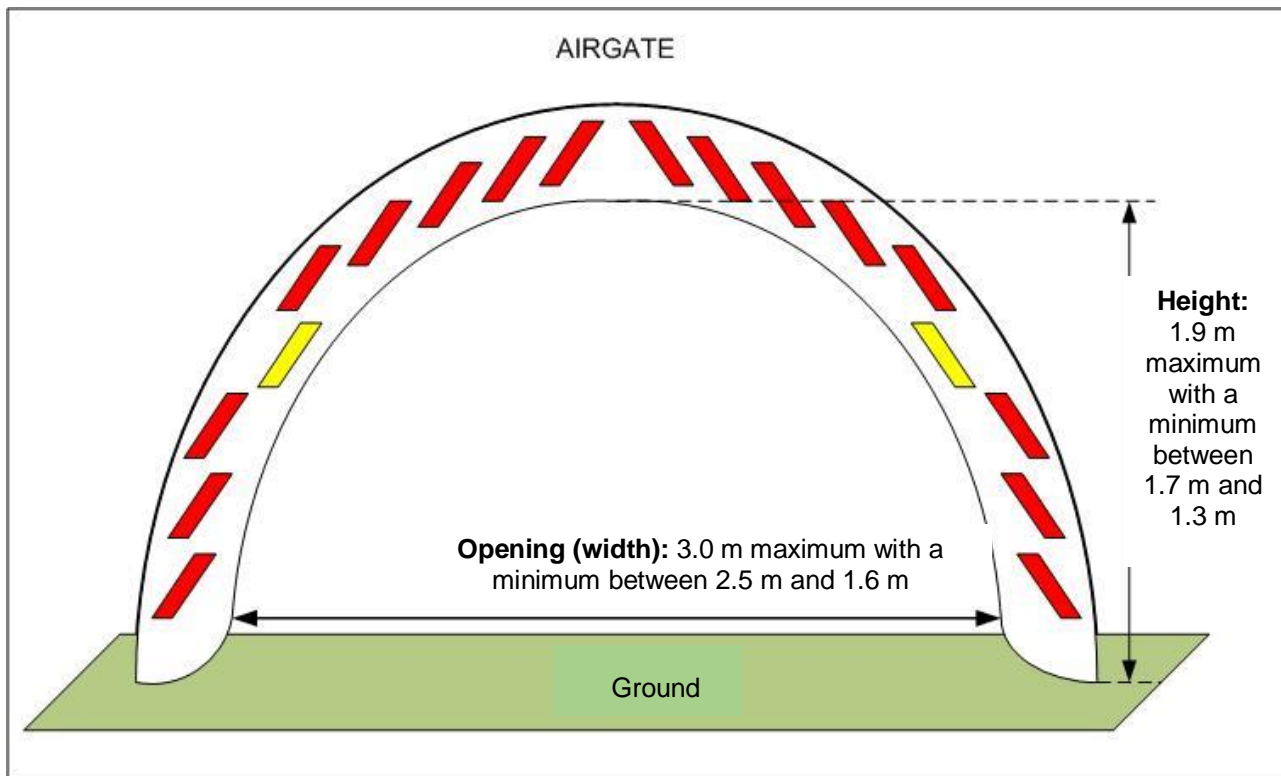
- Width: 3.0 m maximum with a minimum between 2.5 m and 1.6 m.
- Height: 1.9 m maximum with a minimum between 1.7 m and 1.3 m.

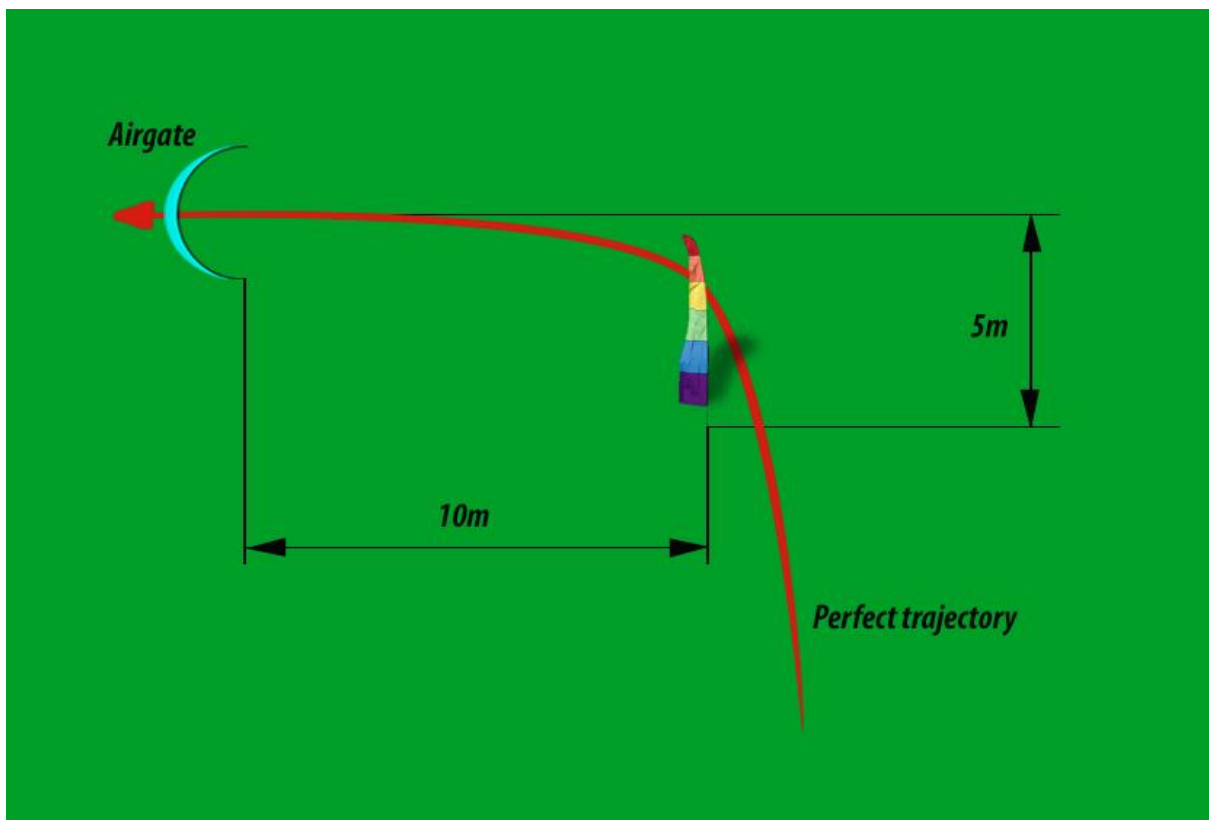
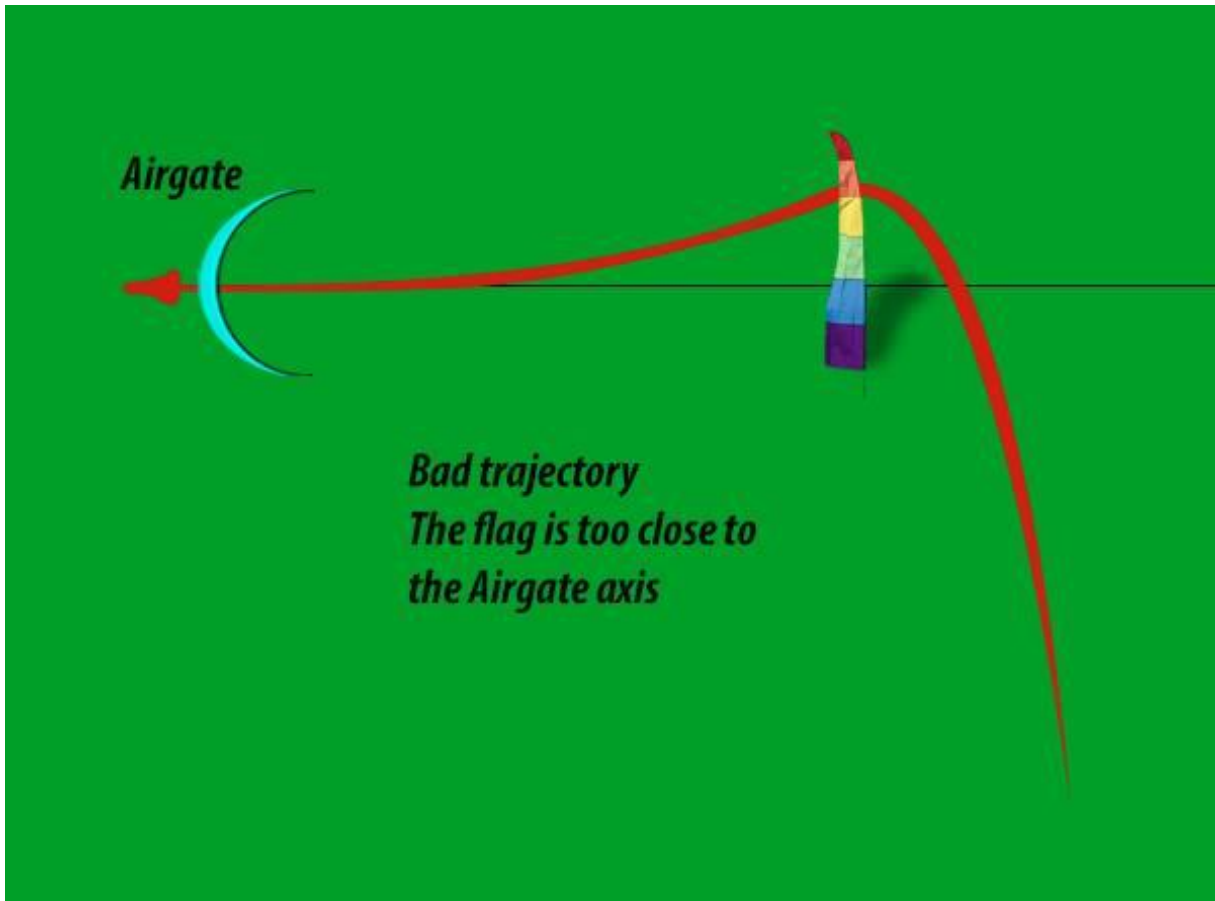
Air gates placed side by side will be considered as only one air gate.

The air gate must contrast with the background and be perfectly visible with a standard FPV video device at a 30 metre distance.

The air gate must be preceded by a minimum 10 metre length straight line and shouldn't be skewed more than 10° relative to its crossing axis.

However, an air gate may be placed in a turn with a recommended minimum radius of 15 m (5 m for a short circuit). In that case, the turn will be marked by flags in order to prevent cuts and sideways passage of the air gate.





2.5. Obstacles

In addition to the air gates, the racing circuit may contain obstacles to be crossed or avoided.

Each obstacle to be crossed will have minimal dimensions of 2 m wide and 1.8 m height. It can be placed on the ground or at a maximum height above the ground of 15 metres, and must be preceded by a minimum 10 metre length straight line on the crossing axis of the obstacle.

The racing circuit can also include obstacles which have to be avoided. These obstacles shall not be placed less than 10 metres from air gates or from obstacles which must be crossed. They should be made as much as possible of shock absorbing materials.

Any obstacle to be crossed or avoided must contrast with the background and be clearly visible with standard FPV devices at a 30 metre distance.

2.6. Start line - Grid pattern

The start may be done on a start line or on a grid pattern (Formula 1 type start). It is recommended to do the start on straight line in the axis of the initial racing circuit trajectory. The start place is not necessarily on the circuit track.

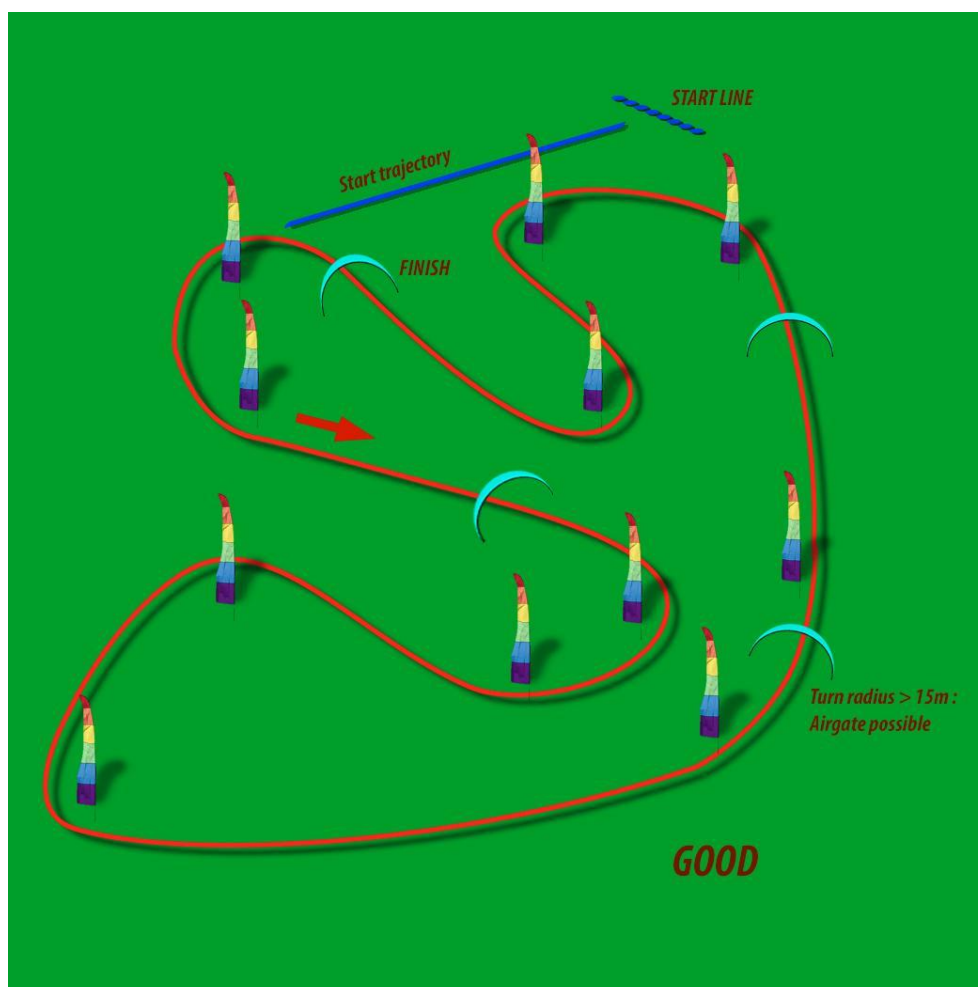
In any case (start line or grid pattern), models will be placed for the start with a minimum distance between models of about 0.5 metre in every direction.

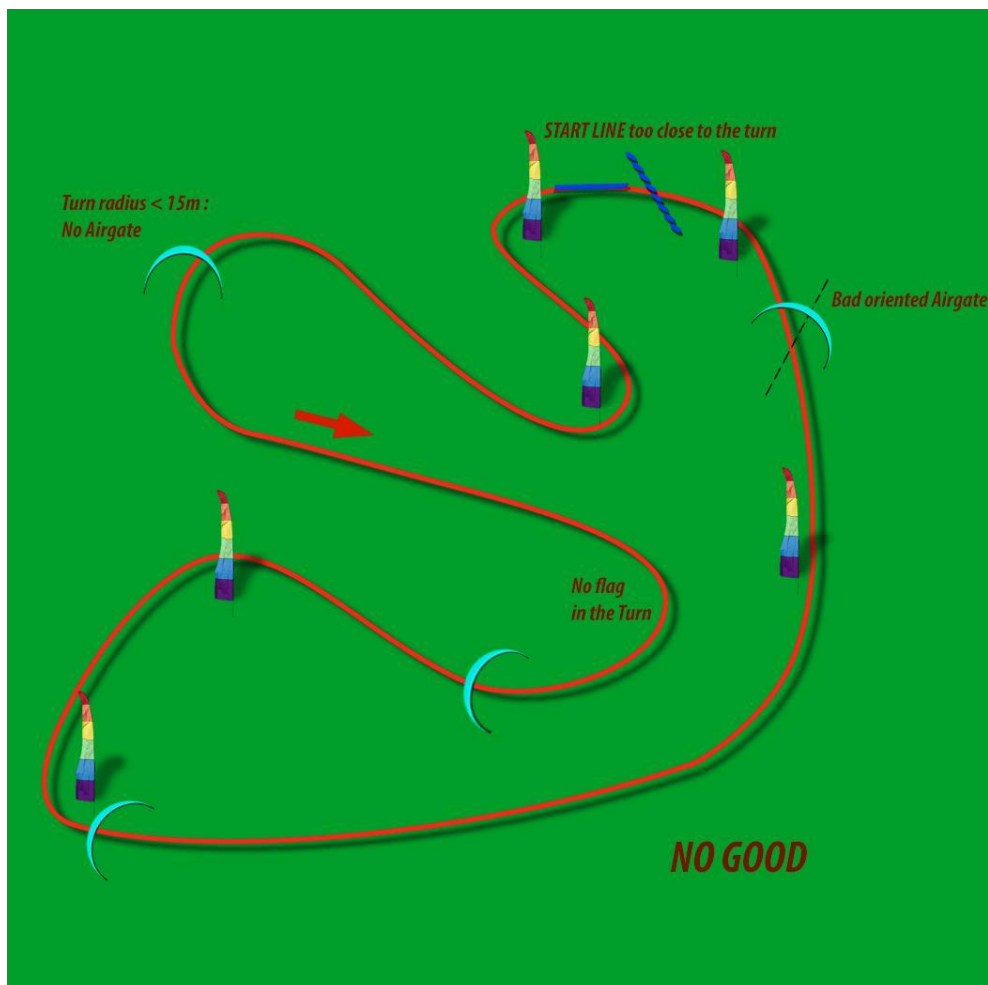
2.7. Other points

The organiser may keep secret the circuit or make it public before the contest.

In both cases, he must do its best for an equal treatment between all competitors and to prevent any unfair advantage to some competitors. If the circuit is made public, it is recommended to publish it two weeks minimum before the contest.

At least one week before the contest, the organiser must inform about the video system that will be used for races and if specific devices will be installed on the models.





3. NUMBER OF MODELS

Each competitor can register and use 3 models for the entire contest.

A model can be used by one competitor only in the same contest.

The competitor can change his model:

- before the start of the race as long he hasn't left the preparation area,
- or between two rounds of the qualification stage and elimination stage.

4. MODEL REGISTRATION AND PROCESSING

Each competitor can register up to three models. The organiser will mark each registered model with an easily visible, difficult to falsify identification such as a sticker.

During registration, the specifications of the model may be checked by the organiser. It is then recommended to do a processing of the model, checking on the following points:

- weight and size;
- motorization and propellers;
- fail-safe and associated device to cut off the engines;
- identification mark.

Random processing of models could be made after flights in any round.

A competitor whose model wouldn't be compliant may be disqualified from the contest by the contest director.

5. CONTEST ORGANISATION

A contest is organised on the basis of three stages:

- Qualification stage (rounds for qualification for the elimination stage).

- Elimination stage (to qualify for the final stage by successive elimination rounds).
- Final stage.

Note: Three options are proposed. It is the responsibility of the organiser to choose which option is the most appropriate for his contest. The option must be the same for the qualification stage and the elimination stage and, where required, for the final stage.

The organiser will define before the beginning of the contest the number of competitors who will go forward to the elimination stage, as well as to the final stage. The number of competitors going forward to the elimination stage will be defined so that a maximum number of the competitors can reach this stage taking into consideration the duration of the contest.

Each round for the qualification stage and the elimination stage is organised by groups (subdivision of the round corresponding to the number of pilots flying at the same time in the same race).

Note: This does not apply to option 2 for the part relative to the qualification stage.

The number of pilots per group can be 4, 6 or 8. This number can be different for each phase of the contest. The number of pilots per group must be announced for each stage before the beginning of the stage in question.

In the case of reflights or withdrawals after the flight order has been published, the number of pilots in a group can be lower than the number originally stated.

Reflights are systematically flown at the end of the round in question.

5.1. Practice flights

Practice flights on the racing circuit other than those authorised by the organiser are strictly forbidden under threat of being disqualified from the contest.

A practice session will be organised at the beginning of the event. Each competitor will only enter this practice session when he has finished his models' registration and processing.

The organiser defines the conditions of the practice session according to the available time and the number of competitors. The conditions must be announced before the event.

It can be a free practice session organised by groups with an allocated time identical for each group. The allocated time and the number of competitors per group are defined by the organiser.

The practice session can also be organised together with the first round of qualifying flights. Each group will be granted one or more practice flights of 3 minutes each. The number of practice flights is defined by the organiser and must be the same for all groups. After its last practice flight, the group will stay on the circuit for its first qualifying flight; a three minutes break to change the battery pack of the model or to change the model is given before the start of the qualifying flight.

In any case, each competitor can do as many circuit laps as he wants during the practice time allowed to his group. Once the practice time is over, competitors still in flight can complete their ongoing circuit lap before landing.

In case of a crash, and when the model cannot go on, the model must stay on ground with engine cut off until the end of the practice session. The competitor cannot request another practice time except if the reason for the crash cannot be attributed to him.

5.2. Procedure for the start of the race

The start of the race is done by the circle marshal.

The start will be done as follows:

- after the models have been placed on the start place (start line or grid pattern), the circle marshal request the competitors if they are ready to start;
- when the circle marshal considers that the competitors are ready, he announces clearly 'Arm your quads';
- about 3 to 5 seconds after this announcement and taking care of an equivalent time or all races, he gives a brief and intelligible sound signal for the start of the race (toot, monosyllable voiced signal such as 'Go', ...); no countdown (3, 2, 1) is required before the start signal.

If the circle marshal is responsible of a false start, then the race is immediately stopped and a new start is done. Before the new start, the competitors will have the possibility to change on their model the battery pack.

5.3. Timekeeping

Unless specified differently, every race needs to be timed.

Timekeeping may be manual or automatic with an electronic timing system.

Note: There is no restriction concerning use of a lap track system respect the system is considered sufficiently reliable by the organiser.

When timekeeping is done manually, timekeeping is triggered when the circle marshal announces the start of the race (except in option 2 for the qualification stage).

When an electronic timing system is used, timekeeping is triggered for each model when the model passes the timing system,

5.4. Qualification stage

The number of qualifying rounds is defined by the organiser according to the available time with a minimum of 3 qualifying rounds.

a) Option 1

A race is run for each group on a number of circuit laps defined by the organiser. The recommended number of circuit laps is 3 for an outdoor field and 5 for a short circuit. The number of circuit laps to be done must be announced before the start of the contest.

The result for each competitor corresponds to his registered time to complete the number of circuit laps, increased where required according to the time penalties as defined in § 6.1.

For each qualifying round, the composition of the groups, the order in each group (for positioning on the start line or on the grid pattern) and the flight order of the groups will be established by a draw.

b) Option 2

Qualifying rounds are run with an allocated flying time defined by the organiser. The allocated flying time must be announced before the start of the qualifying rounds. An allocated flying time of 2 or 3 minutes is recommended.

During this flying time, each pilot flies a maximum number of circuit laps. When the allocated flying time is over, each pilot finishes the last engaged circuit lap and the stopwatch is stopped when the pilot has finished this circuit lap. The time is increased according to the time penalties defined in § 6.1 when appropriate.

In this option, each pilot will start individually (no race per group of pilots) immediately after he is called. The timing will start with the model in flight when the model crosses the start line; so, each pilot flies against the clock and not against other pilots.

The result for each competitor corresponds to the number of circuit laps done with the corresponding registered time. Under these conditions, the following are examples for determining placing:

- 5 circuit laps in 3' 15" is a better result compared to 4 laps in 3' 05".
- 4 circuit laps in 3' 05" is a better result compared to 4 laps in 3' 15".

For each qualifying round, the flight order of the competitors will be established by a draw.

c) Option 3

Qualifying rounds are run with an allocated flying time defined by the organiser. The allocated flying time must be announced before the start of the qualifying rounds. An allocated flying time of 2 or 3 minutes is recommended.

The result of each competitor corresponds to the average of the two best times recorded to perform one circuit lap taking into account all the qualifying flights. The two best times may be done in the same qualifying round or in different ones..

For each qualification round, the composition of the groups and the order in each group (for positioning on the start line or on the grid pattern) and the flight order of the groups will be established by a draw.

For all options, a provisional ranking will be established at the end of the qualifying stage, taking into account the best result obtained by each competitor during the qualifying flights. In the case of a tie for the last place(s) for selection to the elimination stage, placing is made taking into account the 2nd best result for each of the concerned competitors. In the case when the results of the qualifying flights are not sufficient, a tie-break flight will be organised between the competitors in question.

For all options, if the number of competitors defined for the elimination stage is not reached, a new qualifying flight is organised for the competitors who have been unable to set a result at that stage. This will be repeated until the appropriate number of competitors for the elimination stage is reached.

The competitors who need an additional qualifying flight to achieve a result to be selected for the elimination stage will be placed after those who are already selected, and then those who need a second additional flight, and so on.

Competitors who are unable to achieve any result during the qualifying stage will not be ranked.

5.5. Elimination stage

The elimination stage is normally composed of:

- the 1/8th final round (8 groups),
- followed by the 1/4th round (4 groups),
- and then by the semi-final round (2 groups).

If the total number of competitors is not sufficient, the elimination stage can begin directly at the 1/4th round.

Note: 64 pilots are necessary when the elimination stage starts at 1/8th final with 8 pilots/group. 16 pilots are necessary when the elimination stage starts at 1/4th final with 4 pilots/group.

a) Option 1

A race is run for each group on a number of laps defined by the organiser taking into consideration the performance achieved during the qualification stage. It is recommended that the number of laps is defined in order to get race flight times of about 2 minutes to 3 minutes.

Except under exceptional circumstances, the number of laps must be identical for all rounds of the elimination stage. The number of laps must be announced before the beginning of the elimination stage.

The placing for each group's race is done taking into account the order of arrival when the number of laps is completed.

b) Option 2

A race is run for each group with an allocated flying time defined by the organiser, taking into consideration the performance achieved during the qualification stage.

Except under exceptional circumstances, the allocated flying time must be identical for all rounds of the elimination stage. The allocated flying time must be announced before the beginning of the elimination stage.

During this flying time, each pilot flies a maximum of laps. When the allocated flying time is over, each pilot finishes the last engaged lap and the stopwatch is stopped when the pilot has finished this lap. The time is increased according to the time penalties defined in § 6.1 when appropriate.

The placing for each group's race is done taking in account the number of laps done with the corresponding registered time.

c) Option 3

The organizer defines number of rounds with a minimum of three.

A race is run for each group on a number of laps defined by the organiser taking into consideration the performance achieved during the qualification stage.

Except under exceptional circumstances, the number of laps must be identical for all rounds of the elimination stage. The number of laps must be announced before the beginning of the elimination stage.

The groups are formed in the direct placing order after the qualification stage. For example, for groups with 6 pilots, the 6 top placed pilots after the qualification stage are in the group A, the next top 6 are in the group B, and so on. In case of tie, the third best time recorded to perform one circuit lap during the qualifying stage is taken in account.

The composition of the groups do not changed for the different rounds.

For each round, the first race will be done with the group with the higher letter group and so on which means group A will finish the race.

At the end of each race, each pilot is awarded a number of points corresponding to his place (first placed get 1 point, second placed 2 points, etc.). When a pilot does not fly in a race or does not finish it, he gets the maximum possible points plus one extra point (e.g. 5 points with 4 pilots per group, or 7 points with 6 pilots per group).

The final placing in each group will be done taking in account for each competitor the sum of the points he get in all rounds of the elimination stage, the competitor with the low number of points

being placed of the group, and so on.

In case of a tie for the final placing in group A for first, second or third place, a race will be organized between the concerned competitors in order to split the tie.

Composition of the groups for the first round (options 1 and 2 only)

The provisional ranking established at the end of the qualifying rounds will be used as follows to compose the groups and the order in each group (for positioning on the start line or on the grid pattern), according to the established number of pilots per group and depending whether the first elimination round is the 1/8th final round or the 1/4th round.

1/8 th final round																		
8 pilots / Group									6 pilots / Group						4 pilots / Group			
Group A	1	16	24	32	40	48	56	64	1	16	24	32	40	48	1	16	24	32
Group B	8	9	17	25	33	41	49	57	8	9	17	25	33	41	8	9	17	25
Group C	4	13	21	29	37	45	53	61	4	13	21	29	37	45	4	13	21	29
Group D	6	11	19	27	35	43	51	59	6	11	19	27	35	43	6	11	19	27
Group E	5	12	20	28	36	44	52	60	5	12	20	28	36	44	5	12	20	28
Group F	3	14	22	30	38	46	54	62	3	14	22	30	38	46	3	14	22	30
Group G	7	10	18	26	34	42	50	58	7	10	18	26	34	42	7	10	18	26
Group H	2	15	23	31	39	47	55	63	2	15	23	31	39	47	2	15	23	31

1/4 th final round																		
8 pilots / Group									6 pilots / Group						4 pilots / Group			
Group A	1	8	12	16	20	24	28	32	1	8	12	16	20	24	1	8	12	16
Group B	4	5	9	13	17	21	25	29	4	5	9	13	17	21	4	5	9	13
Group C	3	6	10	14	18	22	26	30	3	6	10	14	18	22	3	6	10	14
Group D	2	7	11	15	19	23	27	31	2	7	11	15	19	23	2	7	11	15

In the case where competitors are placed equal in the provisional ranking, the placing for those competitors in the concerned groups will be done by a draw.

The flight order will be group A, then group B and so on.

Selection method for the next rounds (options 1 and 2 only)

Selected for the next elimination round are:

- the four best placed in each group in case of 8 pilots per group,
- the three best placed in each race in case of 6 pilots per group,
- the two best placed in each race in case of 4 pilots per group.

In case of a tie for the last place(s) to select for the 1/4th final round or for the semi-final round, placing is made taking in account the provisional ranking at the end of the qualifying rounds.

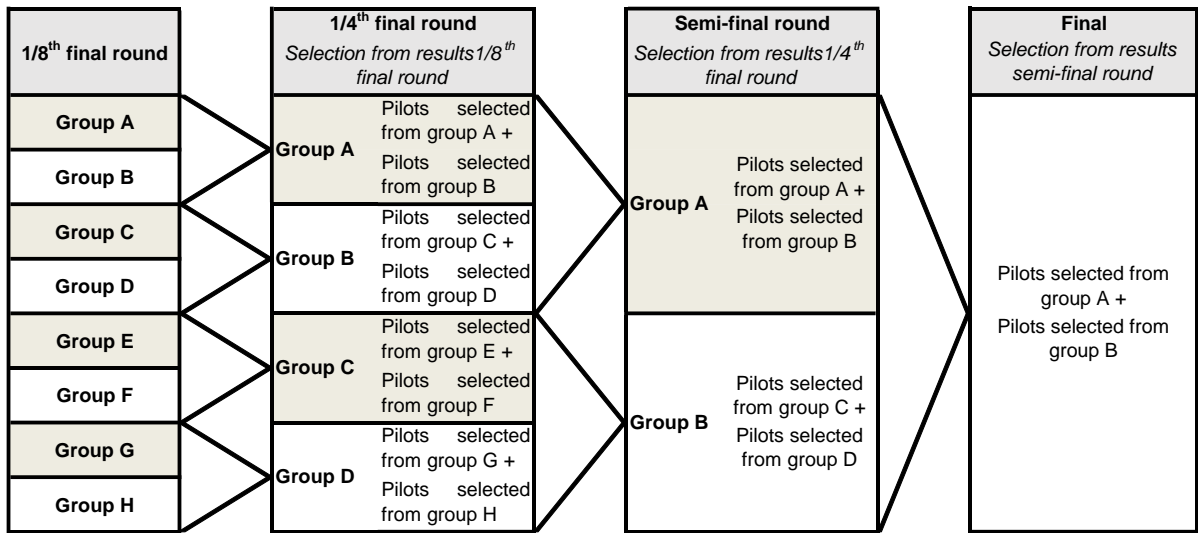
In case of tie for the last place(s) to select for the final, a tie-break flight will be organised between the competitors in question.

When in a race, none of the competitors of the group has been in a situation to finish his flight (crash or other reason), a new flight is organized for this group at the end of the round in question.

Similarly, when in a race it is not possible to select the defined number of competitors for the next round, a new flight is organized between the concerned competitors of the group. This will be repeated until the required number of competitors to be selected is reached.

The same procedure is applied if the number of competitors required for the final is not reached.

The groups are composed in accordance with the following table.



The flight order of the groups will be group A, then group B and so on.

The positioning on the start line for each group can be defined by a draw. When the start is done using a grid pattern, the positioning will be done taking in account the scores in the previous round (top score in front and so on).

Provisional ranking (options 1 and 2 only)

At the end of each round, the new provisional ranking is established from the previous provisional ranking. The competitors who have participated in the round in question and who are selected for the next round will be ranked on top (with a placing based on the provisional ranking after the qualifying phase), followed by those who are not selected for the next round (with a placing based on the provisional ranking after the qualifying phase). Ranking of the other competitors will be based on the previous provisional ranking.

5.6. Final stage

There is no final stage with the option 3.

Options 1 and 2 as they are defined for the elimination stage may also be used for the final stage.

Competitors who flew in the semi-final round and are not selected for the final will fly a round together to determine their ranking (named 'small final' flight).

The number of circuit laps (option 1) or the allocated flight time (option 2) for the final can be increased in comparison to what was used for the elimination stage. In any case, it can be more than twice the number of circuit laps (or allocated flight time). It is defined by the organiser, taking into consideration the autonomy of the batteries to guarantee safe flights.

The number of circuit laps (option 1) or the allocated flight time (option 2) for the 'small final' will be the same as for the elimination stage. In any case, it could be lower than for the semi-final round.

Those who have not been able to finish the final (crash or other reason) will be ranked considering the provisional ranking after the qualifying stage. It is the same for the 'small final' flight.

However, if none of the participants of the final flight has been able to finish his flight, a new final flight will be organised for those who haven't been disqualified, with a number of circuit laps that can be reviewed by the organiser. This does not apply for the 'small final'.

6. FLIGHT OCCURRENCES

6.1. Faults and penalties

In case an air gate or an obstacle that needs to be crossed is not effectively crossed, the pilot may try to execute a manoeuvre to cross the air gate or the obstacle again. If during this manoeuvre the pilot has a collision with another model, he will be disqualified and his result for that flight will not be validated. If the pilot does not cross an air gate or an obstacle to be crossed, the corresponding circuit lap will not be validated by the judge.

In case of a circuit cut (for example during a turn), the competitor may execute as soon as possible a manoeuvre to come back into the circuit where he left it. If during this manoeuvre the pilot has a collision with another model, he will be disqualified and his result for that flight will not be validated. If

the judge considers that the competitor has not made the manoeuvre with sufficient urgency, he can decide that the corresponding circuit lap is not validated.

In the case of an indoor circuit with numerous structural elements or a circuit in woods, for which doing a U-turn because of missing an obstacle or making a circuit cut can be a problem for safety; methods described above may be replaced by time penalties added to the result of the flight and by circuit lap penalties. The penalties for faults (air gate not crossed or obstacle not crossed or circuit cut) are defined as follows:

- 1st fault: 10 seconds.
- 2nd fault: 20 seconds (in addition to the 1st time penalty).
- 3rd fault: 30 seconds (in addition to the previous time penalties).
- 4th fault: 1 circuit lap removed (in addition to the previous time penalties).
- 5th fault: 1 more circuit lap removed (in addition to the previous penalties).
- And so on until a circuit lap is remaining.

When the judge considers that a circuit cut is a voluntary cut to reach the finish line faster, then he can decide that the corresponding circuit lap is not validated rather than to give a time penalty for the fault.

When this system of time penalties is used, all flights need to be timed.

Note: Both systems (requirement of a manoeuvre and time penalty) cannot be mixed.

6.2. Disqualification from the race

A competitor may be disqualified in case of:

- a start before the circle marshal signal, except when an electronic timing system is used if it is considered that this early start does not give an advantage to the concerned competitor;
- a circuit exit (crossing of the safety line);
- a celebratory manoeuvre especially after he finishes his race.

The disqualification is decided by the judge in charge of the competitor.

The judge can also pronounce a disqualification if he considers that:

- the competitor flies so high that it does not allow his performance on the track to be judged;
- the piloting is hazardous or if safety is involved.

When a competitor is disqualified, he must immediately land. When the competitor is considered not being sufficiently cooperative to land, he may be disqualified from the contest by the FAI Jury on request of the judge.

6.3. Crash

When a model crashes, the competitor can go on again if he is in a situation to do so. However, the judge in charge of the competitor can request him to stop the flight if he considers that the model no longer meets acceptable safety standards.

When the model cannot go on, it must stay on ground with engines cut off until the end of the race: the competitor cannot request a reflight.

6.4. Video issues

When a pilot gets a video problem which leads him to consider he is not able to continue his flight, a reflight can only be granted if it is proved that the problem is caused by an identifiable external cause. In the case where the video devices are provided by the organiser, the same arrangements apply; the competitor cannot turn against the organiser.

In case of a failure of the video system which does not allow the judge to perform his task:

- In a qualifying flight, the flight is cancelled and the competitor is granted a reflight.
- In any flight in the elimination rounds, the judge allows the flight to finish without reporting the problem and does his best to judge and validate the circuit laps. When the result of the competitor permits him to be selected for the next elimination round (or for the final), the flight is then cancelled and the competitor is granted a reflight.
- In the final flight, the judge allows the flight to finish without reporting the problem and does his best to judge and validate the circuit laps. If the competitor wins, the final flight is then re-run.

6.5. Reflight

Apart from the possibilities of obtaining a reflight mentioned above, a reflight can be granted when either the start of the model or the flight cannot be done in normal conditions because of an unexpected cause beyond the pilot's control.

A reflight can be granted when, for a reason of safety, either the preparation of the model or the flight cannot be made in the allotted time limit or when either is disrupted by an external interference.

A reflight can be granted if, for a reason independent from the competitor's will, he has been forced to land on request of an official.

Failures of the model, motorization or radio cannot be considered as reasons independent from the competitor's will.

Incidents during races such as collisions between models or with obstacles cannot justify a reflight.

Noise in the environment of the competitors (noise in the public, noise from other competitors,...) cannot justify a reflight.

A reflight may be considered in case of a rush of a competitor or of his chair clearly affects his flight. If the helper is at the origin of the problem, a reflight cannot be granted.

Granting of a reflight is the responsibility of the contest director. For the competitor in question, being granted a reflight results in the automatic cancellation of the flight for which he has been granted the reflight.

7. HELPER

Each competitor FPV pilot is assisted by one and only one helper who stays next to him during the whole flight.

The first job of the helper is to keep the model in visual line of sight.

Besides that, the helper must inform the competitor of anything occurring that can affect his piloting, especially about safety. If the helper requests the competitor to land or to cut off the engines, he has to do it immediately.

In case of emergency, the helper is authorised to shut off the transmitter in order to trigger the fail-safe device.

8. OFFICIALS

8.1. Officials needed to run the contest

The running of a contest requires the following officials:

- Contest director in charge of preparation, organisation and oversight of the contest. He especially has to ensure compliance with the applicable rules and safety during the whole contest.
- Circle marshal in charge of calling competitors for racing; of the conditions under which models are prepared and of checking their preparation; of checking flight times; for oversight of the models during transfer to the take-off area; and of giving the start signal for each flight with an audible device (whistle, foghorn, ...).
- Judges (one per competitor in flight) in charge of checking all aspects of the competitor's racing on the circuit and of timekeeping.
- Official responsible for checking the models' weights and identification marks (number and height of lettering).
- Official responsible for score sheet gathering.
- Official responsible for results accounting.

When the timekeeping is done manually, one timekeeper per competitor in flight may help the judge.

According to the contest standing and the number of competitors, some official tasks may be assumed by the same person.

8.2. FAI Jury

In any FAI Open International contest, an FAI Jury must be nominated according to Volume CIAM General Rules C.7.1 and C.7.3.

8.3. Judges

In each race, each FPV pilot will be accompanied by a judge standing next to or behind him.

The judge will have a video device available allowing him to follow the flight of his competitor in real time. It is highly recommended that the judge and the competitor share the same VRX (video receptor).

The judge must inform the competitor loudly when an air gate or an obstacle is not considered to be crossed, or of a circuit cut. He will monitor that the competitor goes back and crosses the gate or the obstacle correctly, or comes back to the point where the cut happened.

Note: *The organiser can also provide one or several specific line judges in charge of informing the judges if a model crosses the safety line (exit of the circuit).*

At the end of the flight, the judge informs the competitor if the flight is considered to be valid or if a disqualification has been pronounced; in the case of disqualification, the number of circuit laps done at the moment of the disqualification will be mentioned by the judge to the competitor and registered.

9. INTERRUPTION OF THE CONTEST

The contest director may interrupt the competition or delay the start of a race if the wind is continuously stronger than 9 m/s measured at two (2) metres above the ground near the preparation area for at least one (1) minute.

When interruption occurs during an official flight, this flight is cancelled.

If the contest cannot go on, the final ranking will be the last available provisional ranking.

10. COMPETITORS' INFORMATION

The organiser has to display at the site:

- FAI Jury composition;
- start list for every round;
- times achieved after each qualifying round;
- results of each elimination round;
- provisional rankings and final placing.

Note: *A posting on Internet is also advised if conditions permit it, in order to make it possible for those who are not at the site to follow the progress of the contest.*

ANNEX

DRONE RACING WORLD CUP RULES

1- Class

The FAI provisional class F3U (Multi-rotor FPV Racing) is recognised for World Cup competition in FPV Racing.

2- Competitors

All competitors in the specified open international contests are eligible for the World Cup.

3- Contests

Only the FAI Open International contests may be considered for the World Cup.

The selection of the contests eligible for inclusion in the World Cup for a particular year will be done before the end of the preceding year. In duly justified cases, a contest can be exceptionally added after this date at the FPV Racing and similar activities Subcommittee Chairman discretion.

Contests included in the World Cup will be indicated on the FAI Contest Calendar and must be run according to the FAI Sporting Code.

A maximum of two contests may be selected for any country on its own behalf unless the country extends over more than three time zones; in that case, one contest may be selected within each time zone of the country with a maximum of four contests for the country on its own behalf.

A country may choose to fly a World Cup event at a flying site in another country provided that the registration of the event on the FAI calendar is submitted by the organising country and the name of the organising country is included in the title of the event. Any country may host a maximum of one competition on behalf of another organising country regardless of whether or not the host country extends over more than three time zones.

4- Points allocation

In a contest, points for the World Cup will only be allocated if the competitors who have completed a flight are from at least two different countries.

The points to be allocated to competitors will depend on the number (N) of competitors who have completed at least one flight in the event.

Points are allocated to the competitors who have completed at least one flight in the event, according to their placing in the results, as following.

a) N > 40

Placing	1	2	3	4	5	6	.....	40	41 and after
Points	40	39	38	37	36	35	.....	1	0

A bonus of 8 points is given to the first placed competitor; 5 points to the second placed and 3 points to the third placed.

b) N = 40 or N < 40

Placing	1	2	3	4	5	6	.....	N-1	N
Points	N	N-1	N-2	N-3	N-4	N-5	.....	2	1

The bonus is defined as follows:

- for the first placed competitor, N/5 rounded up to the nearest whole number of points with a maximum of 8 points;
- for the second placed competitor, N/8 rounded up to the nearest whole number of points with a maximum of 5 points;
- for the third placed competitor, N/13 rounded up to the nearest whole number of points with a maximum of 3 points.

In the event of a tie for any placing, the competitors with that placing will share the points which would have been awarded to the places covered had the tie been resolved (round up the score to the nearest whole number of points).

5- Classification

The World Cup results are determined by considering the points obtained by each competitor in the World Cup events.

For each competitor, one contest result per organising country may be considered for the World Cup placing (better number of points for any organising country in which he has scored in two contests). For a country which extends over more than three time zones, one contest may be counted for this organising country within each time zone of the country.

The total World Cup score of the competitor is the sum of his best four contest results (numbers of points). The winner of the World Cup is the competitor with the greatest total score, and so on for the placing.

In the event of a tie for first, second or third place, placing will be determined by taking in account for the competitors in question, their best fifth result, then if necessary their sixth best result, and so on. If this does not separate the tied competitors, then the placing will be determined by considering for their best four results the points that they obtained in each of those four events multiplied by the number of competitors who will have completed at least one flight in the event; the winner is the one with the greatest total thus calculated.

6- Awards

The winner is awarded the title of the winner of the World Cup.

Medals, trophies, prizes, or certificates may also be awarded as available.

7- Organisation

Administration, collect of the results, calculation of the placing and regular publication of the current World Cup positions are normally done by the FPV Racing and similar activities Subcommittee Chairman.

A dedicated World Cup Coordinator may be nominated. Such a nomination is done by the CIAM Bureau on proposition of the FPV Racing and similar activities Subcommittee Chairman.

8- Communication

The World Cup results and placing could be distributed to the news agencies and also be available, by payment of a subscription, to any interested bodies or individuals.

Final results of the World Cup must be sent also to the CIAM with the annual report to be done by the World Cup Coordinator.

9- Responsibilities of a contest organiser

The contest organisers must propose their contest for inclusion in the World Cup on the CIAM form for registration on the FAI Aeromodelling Sporting Calendar.

The selection of the contests eligible for inclusion in the World Cup will be done from those proposals as specified in paragraph 3.

Immediately after the contest, the organiser must send the results in electronic form to the World Cup coordinator, at least within one month as required by the CIAM rules. Any failure to return results promptly will be reviewed when considering the contests for inclusion in the World Cup for the following year.

10- World Cup Board

A Board of three persons shall be nominated by the FPV Racing and similar activities Subcommittee Chairman to rule on any issue concerning the implementation of World Cup rules during a year. Any such issue must be submitted in writing to the Subcommittee Chairman. The World Cup Board is not entitled to deal with any kind of complaint or protest concerning a single competition, which must be considered by the FAI Jury for that competition.